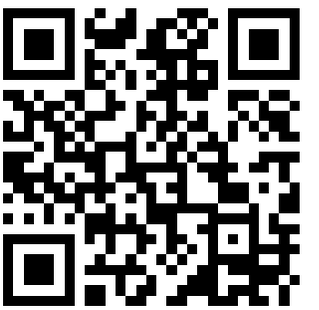
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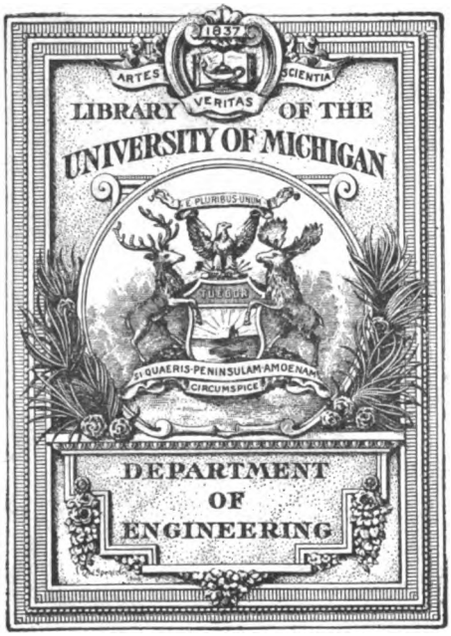
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VOLUME 6 NUMBER 1

THE AMERICAN BLACKSMITH

A Practical Journal of Blacksmithing and Wagonmaking

BUFFALO N.Y. U.S.A.

OCTOBER, 1906

$1.00 A YEAR
10c A COPY

A SQUARE DEAL IN ADJUSTABLE CALKS



Honest Clear Through.

Better Calks and Protection to Horseshoers Demanded

The day when two or three wealthy calk manufacturers could play trade tyrants is over. Horseshoers and horse-owners are demanding fair treatment—better calks and smaller manufacturing profits, protection to the horseshoers and a guaranty of the wearing qualities of the calks.

Only the Rowe Calk Meets the New Standard

The Rowe Patent Calk Company is the only concern that has seized the opportunity and that is doing business on a modern basis. It is offering the only calk that is scientifically made, the only perfect calk that has ever been sold. And the prices are less than those charged for inferior substitutes.

Has the Only Shoulder That Presses the Shoe

The Rowe calk excels in all points. It is the only calk with a shoulder that can be screwed against the shoe. A shoulder that does not press the shoe is worthless. This pinch-nut feature of the Rowe calk is protected by a patent that does not expire for eight years. Until then the Rowe calk will be the only one that certainly will not bend, break off or become loose in travelling. Moreover, it will always come out without broken threads. Take any other calk and note how the shoulders are jammed, broken and rounded.

Only Calk with a Welded Steel Center

Only the Rowe calk has a welded steel center running from end to end. This is made by a secret process. Other steel center calks are substitutes, carrying a piece of steel wire that is forced into the calk. It is plain that the substitute will not wear.

Rowe Calks Turned from Solid Bars

Most calks are forged and are necessarily imperfect and not uniform. Rowe calks are neither forged, rolled nor pressed. They are turned out of solid bars by special machinery and each calk is mechanically perfect and adapted to its work.

Rowe Calks Guaranteed Money Back if not the Best

We stake our business and capital upon our claims to superiority. We guarantee Rowe Patent Calks to wear longer and better than any other steel center calks. If they do not, any horseshoer may return the calks and get his money. This is the supreme test and no other manufacturer dares to face it.

Sold Only to Horseshoers—Calks Endorsed by Master Horseshoers N. P. Association

The Rowe Patent Calk Company is under contract and bond with the Master Horseshoers' National Protective Association to sell only to horseshoers. Its representatives took a leading part in drawing the new contract, which is the first one that ever really protected the horseshoer.

Send for Trial Hundred Special Offer Express Prepaid

Wherever Rowe calks are once used they are always used. The Rowe Company desires to put a trial hundred into every shop in the snow-belt of America and Canada, and it will express prepaid to any horseshoer anywhere one hundred calks of any size at the prices named below—the regular new prices to horseshoers.

Money Refunded if not Satisfactory

We are paying for this ad. not to sell calks now, but to get you to test them. Fill out the slip below and mail it today. If the calks are not satisfactory, send them back and get your money. **Be sure to give the name and address of your supply house.** Only 100 calks sold to one horseshoer under this offer.

New Price-List to Horseshoers.

	3-8	7-16	1-2	9-16	5-8
Sharp or Blunt,	$2.10	2.30	2.50	2.70	3.00

I enclose $..... for 100 calks, ... inch size, express prepaid.

Name.....

Street.....

City.....

My Supply House is.....

.....

Address .....

.....

MAIL TO
The Rowe Patent Calk Co.,
A.B. HARTFORD, CONN.

If you do not wish to cut this page, send order on separate sheet.

Send us the names and addresses of your customers and we will mail to each an attractive booklet describing the merits of our calks and bearing your name and address in a prominent position.

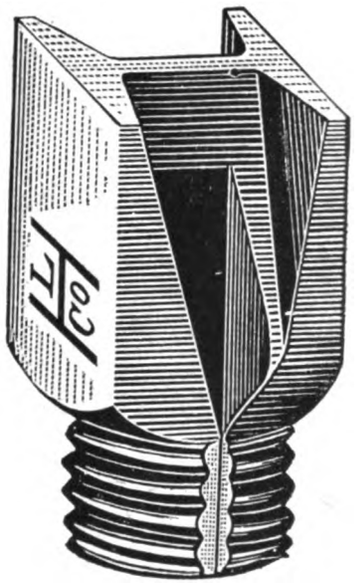
Coupons in Every Box.

THE ROWE PATENT CALK COMPANY,

HARTFORD, CONN.

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PATENT



H



CALK

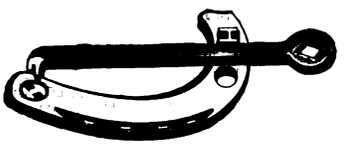
ALWAYS SHARP! NO SLIPPING OF THE HORSE.
NO INJURIES AS CAUSED BY OTHER CALKS!
GREAT SAVING OF HORSES AND HORSESHOERS.

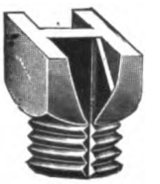
Guaranteed to Outlast Every Other Device of The Kind.



WHEN NEW!

Can be Removed Even if Worn Down to the Shoe.





HALF WORN!
Always Sharp!

H Calks have been in use over 25 years

Sold to Horseshoers Only

H Calks have saved more horses than all other devices of the kind together

THE ONLY INSERTIBLE HORSE SHOE CALK USED IN THE GERMAN, RUSSIAN AND AUSTRIAN ARMIES.

Write for Circulars and Price List.

H CALK CO.,

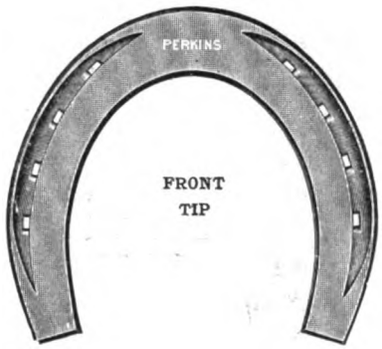
16 Beaver Street **NEW YORK CITY**

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HIND
LONG HEEL.

Look for this Trade Mark ★ The Star brand beats all others



FRONT
TIP



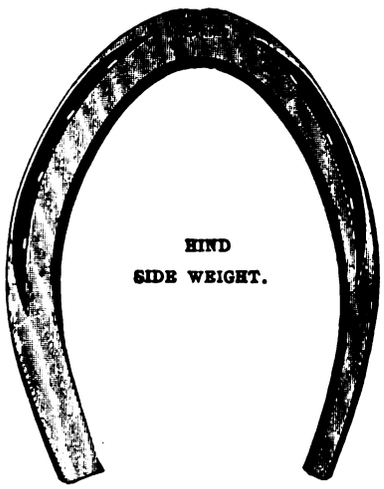
FRONT
LIGHT.



FRONT
TOE WEIGHT.

★PERKINS★
HORSE SHOES
AND
TOE CALKS
The **SUPERIOR** Kind

Have more points of superiority than any other make. An up-to-date shoe for up-to-date Blacksmiths.


HIND
SIDE WEIGHT.

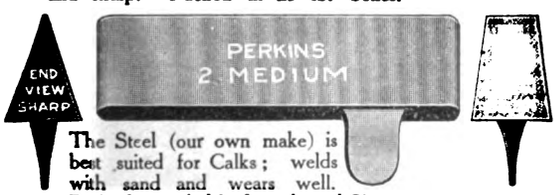
Perkins Shoes have given satisfaction wherever used. Our line is complete and every shoe guaranteed. Made in all styles and sizes. Send for sample. New Pattern Front Extra Light and Light. Free for the asking. We will gladly send

COMPLETE CATALOGUE AND SAMPLES FREE.

WRITE TODAY.

PERKINS

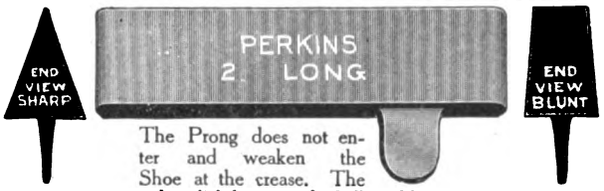
Made in Medium and Long, both blunt and sharp. Packed in 25 lb. boxes.



The Steel (our own make) is best suited for Calks; welds with sand and wears well. Perfectly graded in Length and Size.

TOE CALKS

Chisel Pointed Prong. These cuts show exact size of No. 2. SAMPLES SENT FREE.



The Prong does not enter and weaken the Shoe at the crease. The only slightly curved Calk sold.

MANUFACTURED BY

RHODE ISLAND PERKINS HORSE SHOE COMPANY

PROVIDENCE, RHODE ISLAND.

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Our Tools Are Rank Failures

IF YOU are looking for a complicated, expensive, easily broken tool—one that will eat up your profits—then our tools are rank failures for your purposes.

But if you are one of those fellows who want quality and simplicity and durability in a tool, and don't mind seeing a few extra dollars floating your way every week in the shape of increased profits, then we advise you to invest a penny for a post card, and send for our booklet "Carriage Maker and Blacksmith Tools."

It illustrates and describes modern tools for the shop—maybe just the things you've needed. Your business sense won't let you overlook such an increase of profits very long. Better spend the penny—then you be the judge.

We mention only a few of our machines here. Send for booklet for full information.

SPOKE TENON MACHINE—for hand or power; durable, practical and does accurate work.

"ELITE" BLOWER—noiseless, easy running. Phosphor bronze interchangeable bearings, simple, strong and durable—blast powerful and lasting.-

BAND SAWS—neat, new designs, substantial construction, table adjustable to different angles up to 45° for bevel sawing; used for cutting cloth, ice, cardboard, sheet metal, brass, etc.; several sizes.

DRILLS—Post, Swing and Bench Drills, hand and power. Every wanted size. New, simple, efficient and positive; for shops and small factories, smith shops, repair shops, iron furnaces, carriage and wagon shops.

NEW TAPER HUB BORING MACHINES—centre the hub instantly and accurately; instantly adjusted for taper or straight bore.

PORTABLE FORGES—in all sizes and prices—light-running, convenient, durable and economical—real money savers.

We want to prove the merits of these and our other machines. *Ask us for our booklet "Carriage Maker and Blacksmith Tools."* It's free.

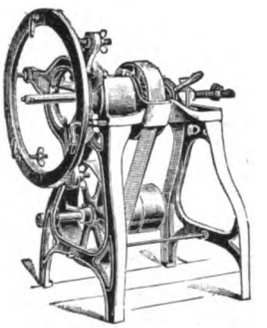


Fig. 708.
HUB BORING MACHINE.

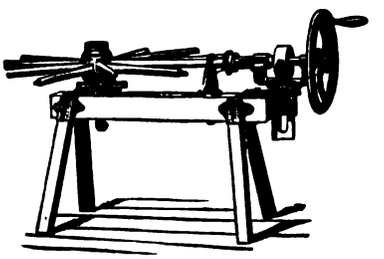
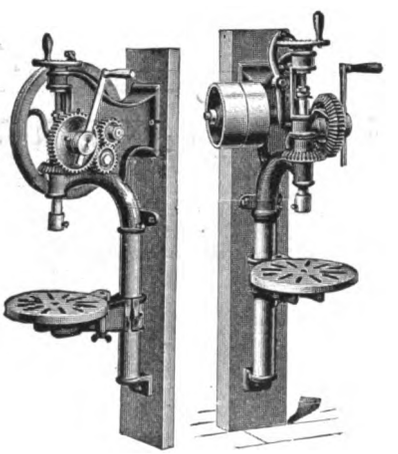


Fig. 718
SPOKE TENON MACHINE.



Figs. 744 and 750.
HAND and POWER DRILLS.

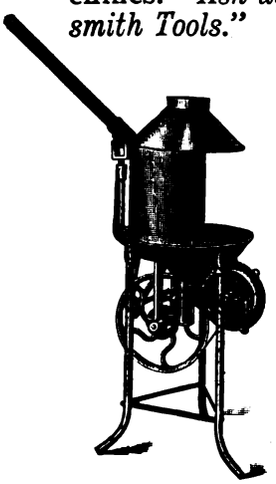


Fig. 904.
LEVER FORGE.

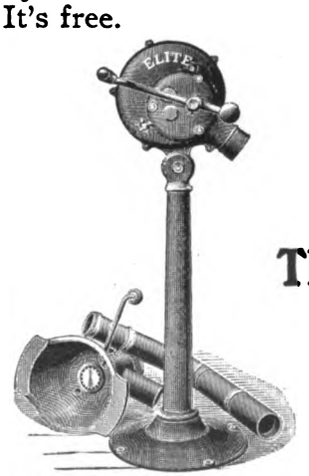


Fig. 900.
"ELITE" BLOWER.

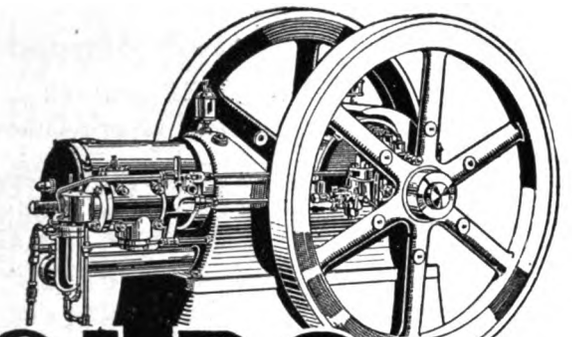
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The Silver Mfg. Co.

365 BROADWAY,

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OLDS ENGINES

The gasoline engine best adapted to blacksmith work is the Olds Engine. It is simple—requires very little attention—will not get out of order.

Repairs Practically Cost Nothing

It gives an economical power, without bother, and can be depended upon any time it is wanted.

Our catalog tells why this is so—please send for it and hear our story.

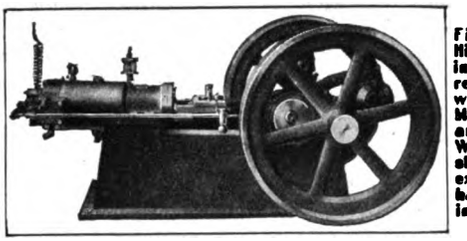
We make engines from 2 to 1200 h. p. The one you want at the price you want to pay.

OLDS GAS POWER CO.,

975 Chestnut St. LANSING, Mich.

Built in sizes 4 to 50 H.P.

1907 MODEL now ready



First-Class High-Grade in every respect with Best Material and Workmanship and extremely handsome in design.

If you are in need of power, - - - - BUY THE

If you intend later to install an engine, BEAR IN MIND ROBERTSON

If your friend is thinking about buying an engine, TELL HIM ABOUT STRAIGHT LINE Gas and Gasoline ENGINE.

If interested at all in power, WRITE FOR INFORMATION ABOUT

Write anyway, stating size.

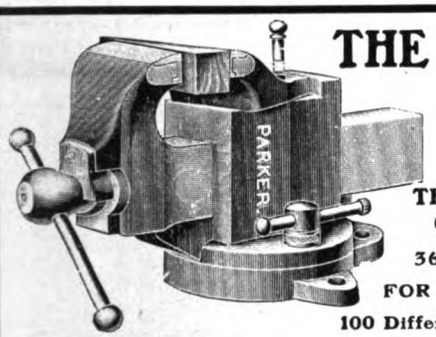
When you buy a ROBERTSON you are sure to be right,
Note that crosshead. No wear on cylinders,
No loss of fuel or compression,
Simple in construction. Easy to operate.
It will outlive the ordinary engine by many years.
No batteries. Spark when wanted.

We are now shipping our 1907 model straight-line vertical engines, high-class in every respect. Built in sizes 2½ to 10 H.P.

WRITE STATING SIZE.

The Robertson Mfg. Co.,

BUFFALO, N. Y., U. S. A.



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THE MOST RELIABLE ON THE MARKET

36 Different Styles.

FOR ALL PURPOSES.

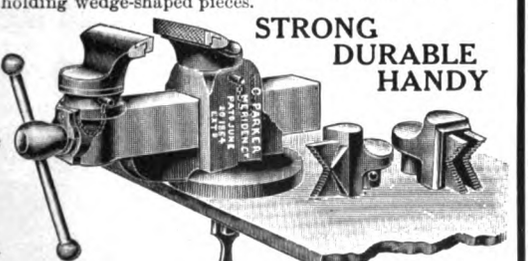
100 Different Sizes.

Parker vises will be found in the best equipped shops in the country. No other vise has given to the trade such general satisfaction. Our new line of improved vises has reinforced sliding jaws, making the Parker vises stronger and more durable than ever.

Made of a blending of steel and best iron in the castings.

The steel faces on these vises are milled and fitted to the jaws and are removable. Have self-adjusting back jaws which automatically adapt themselves for holding wedge-shaped pieces.

STRONG
DURABLE
HANDY

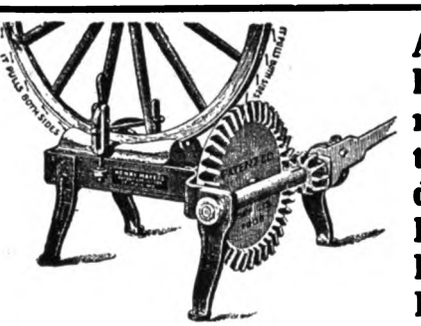


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A tool of many uses. Both round and pipe jaws interchangeable. Weight, 76 lbs.

THE CHAS. PARKER CO.,

MERIDEN, CONN.



A MAN fed his hens one-third meal and two-thirds saw dust. The HENS did not know the DIFFERENCE until the eggs hatched woodpeckers. Moral: To be "Punched and Sheared, mix 'em up." To Hatch CHICKENS, do as this wise man did in Nebraska. KNOW what you are GETTING and know by COMPARISON. We stand ready to show you.

Staplehurst, Neb., Sept. 4th, 1906.

Henry Mayers Machy. Co., St. Louis, Mo.

Dear Sirs:—Enclosed find settlement for cold tire setter and in regard to same have this to say: As you know (and I hope you will pardon my liberty) I have had your machine a good while before I could satisfy myself, and settle for same. It was not with the intention of delaying you or deferring payment, but I will say I have seen and helped to operate three other machines since having yours in my shop and can say candidly the "Mayers" is the machine for me, as I assure you I have certainly given same a TEST which all machines, I venture to say, are not subjected to. I desire to thank you kindly for the courteous manner in which you have dealt with me, and wish you an abundance of success, which your machine will certainly bring to you when gotten before the blacksmiths of the country, as it is a labor saver, time saver and money maker. Pardon my somewhat lengthy letter also my delay in this matter as I am entirely satisfied. Thanking you again, I remain, Yours truly. Edw. J. Meyers.

While it is late in the season we have a proposition which will INTEREST you and show you we mean business.

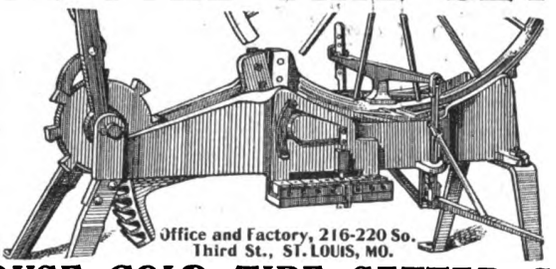
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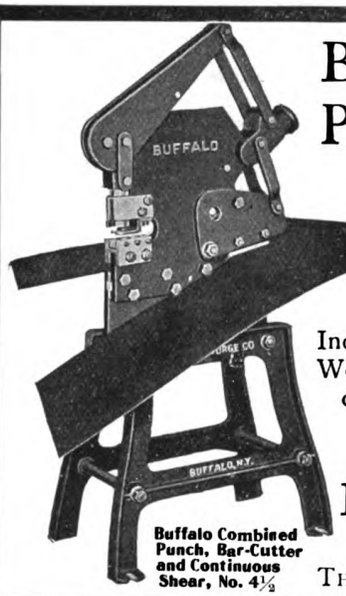
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PATENTS PROTECT YOUR IDEAS

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Branches at CHICAGO, CLEVELAND, DETROIT.



Buffalo Combined Punch, Bar-Cutter and Continuous Shear, No. 4½

BUFFALO ARMOR PLATE
PUNCHES AND SHEARS
NO CAST-IRON TO BREAK

These machines are built of Armor Plate, Drop Forgings and Crucible Steel. Stands are of Cast Iron.

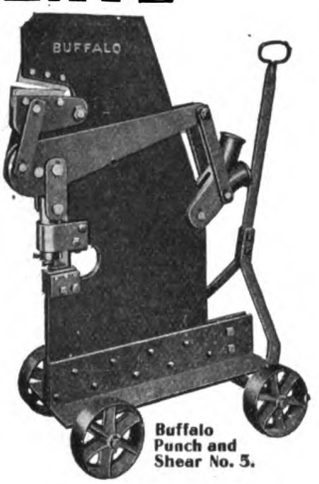
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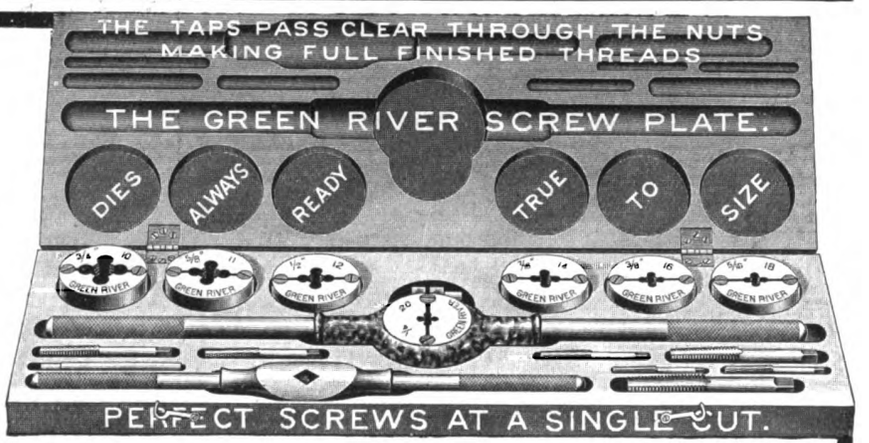


Buffalo Punch and Shear No. 5.

1872 to 1906

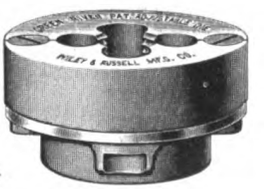
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for
BLACKSMITHS

Catalogue 33D Free



"Used all over the World."



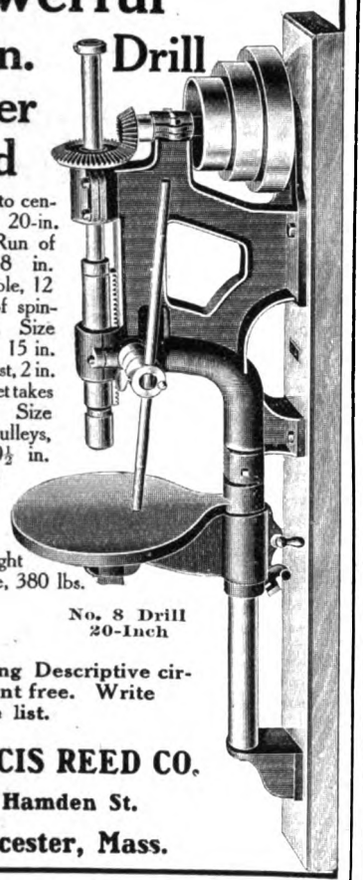


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Will drill to centre of a 20-in. circle. Run of spindle, 8 in. Run of table, 12 in. Size of spindle, 1½ in. Size of table, 15 in. Size of post, 2 in. Drill socket takes 41-64-in. Size of cone pulleys, 6¾, 8½, 10½ in. Tight and loose pulleys, 8 x 3 in. Total weight of machine, 380 lbs.

No. 8 Drill
20-Inch

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43 Hamden St.
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THE BEST BLADES FOR YOUR WORK
are "EUREKA" for hand frame and "X. L." for power machines.

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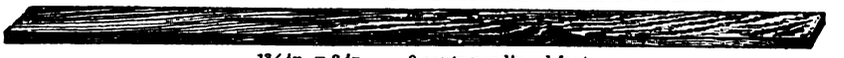
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1⅜ in. x 8 in. — 8 cents per lineal foot.
1⅜ in. x 8½ in.— 9 " " "
1⅜ in. x 4 in. — 10 " " "

All Sizes in Two Foot Lengths up to Sixteen Feet

Blacksmith Agents Wanted

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We sell an elegant Top Buggy for only $37.50, on terms of $10.00 cash, balance payable $5.00 month; no interest.

We manufacture a complete line of Buggies, Surreys, Spring and Farm Wagons.

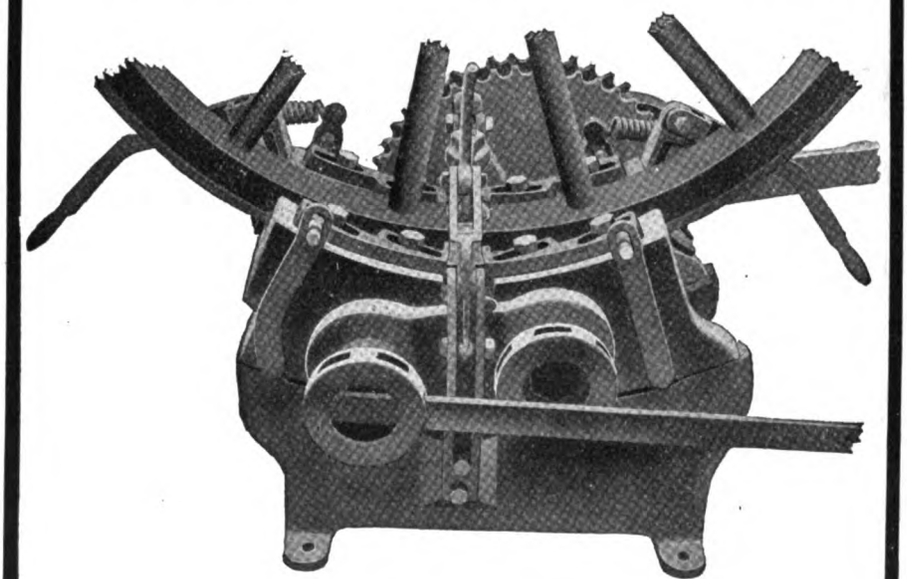
We trust honest people located in all parts of the world. Write us for free catalogue and particulars.

Century Mfg. Co.
Dept. A. B.
EAST ST. LOUIS, ILL.

ARE YOU AWAKE

to the fact that your customers can be organized into a body of ardent advertisers for you? THE BROOKS WILL DO IT? Every customer concedes its superior work over all others and knows that it cannot be duplicated in any other way. They are so well pleased that they talk it to their neighbors and they become your customers and advertisers, thus it forms a growing chain of advertisers for your business. Nothing can be added to your shop that will increase your business as the Brooks will. Boom your business by getting one now. It is the acknowledged superior of every other make. It is the only one that has stood the Government tests and in use in the United States Government shops.

The Brooks Cold Tire Setter



Adopted by the United States Government
Sets tires 4½ inches and all smaller sizes

once in your shop, eliminates all chances for a miscalculation and dissatisfied customers. They all become your advertisers and talk your machine.

The Brooks is the most durable and most powerful machine ever offered to the trade. It has an automatic grip key tightening device, which no other machine has. It is mechanically constructed in every detail. It is the result of the long experience of the oldest builders of edge grip cold tire setters. Our machines far excel anything ever built in the cold tire setter line. No other machine does its work so well, so easily and so quickly and is as durable. Our descriptive booklet, special terms and a handy vest pocket memorandum book sent free for the asking.

THE BROOKS TIRE MACHINE COMPANY
121 North Water St. WICHTA, KANSAS.

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MORGAN & WRIGHT PADS

Offer their Services to Any Shoer Who Believes that Good Pads Help to Build up a Good Business.

No one knows better than does the shoer that a first-class way to kill the pad business is to use second-class pads--- pads that are not scientifically made and that do not give the wear that good pads both should and do.

It's next to impossible to find a shoer who has begun the use of Morgan & Wright Pads who has not made a specialty of them afterwards.

Easy to fit.
Run larger than other brands.
A pad for every purpose---15 in all.
Try them.

MORGAN & WRIGHT, Detroit.

The Bradley

Ball Bearing

Shaft Coupling Automatically Takes Up the Wear

THE point is, you want a noiseless, quick-shifting Coupling that will stand the test of time. The BRADLEY does this. In the BRADLEY the shaft eye is surrounded by a packing of hard oak leather, compressed and moulded into shape and thoroughly saturated with tallow. This packing is the only part of the BRADLEY that wears.

BUT in the BRADLEY SHAFT COUPLING there is also a SPRING, of crucible steel, oil tempered and tested. The spring automatically takes up the wear on the leather packing.



"The spring does it."

THE spring's the thing that does the business. Its pressure is constant and uniform—just sufficient to hold the coupling, with its leather packing, securely in place, and TAKE UP THE WEAR. The BRADLEY is the ONE and ONLY SHAFT COUPLING that takes up its own wear.

C. C. BRADLEY & SON
SYRACUSE, N. Y.

Don't forget that we make Bradley Ball BearingCouplings

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Reinforced DIAMOND Welds



USED ON ALL OUR POLES AND SHAFTS.

THE PIONEER POLE & SHAFT Co.

PIQUA, OHIO.

SEND FOR POLE AND SHAFT CATALOGUE AND PRICES.

F.C. HUMANS Co. CIN. O.

ECCLES BALL-BEARING COUPLINGS

WITH LEATHER BUSHINGS

We make these Couplings in Buggy and Surrey sizes, and with Extension for Welding on an Axle Step.

Note how the Spring is fastened at the front end by a pivot, so that it can be TURNED FORWARD out of the way, while clipping the Coupling on the Axle.



We make Wide Center Clips, both 5-16 and 3-8, and Square Clips for use with these Couplings, also Solid Forged Step Shank Clips.

PATENTED NOV. 25, 1902.

The ease with which our Couplings are put on will save you money.

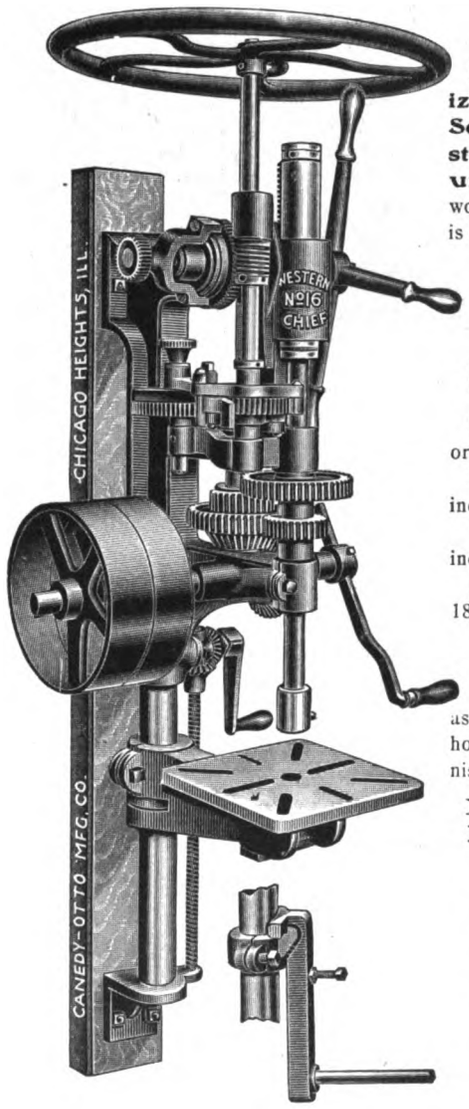
WE ARE MANUFACTURERS OF A FULL LINE OF

CARRIAGE AND WAGON FORGINGS

RICHARD ECCLES CO. ***Auburn, N. Y.***

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No. 16 = Western Chief Drills = No. 17



DESCRIPTION

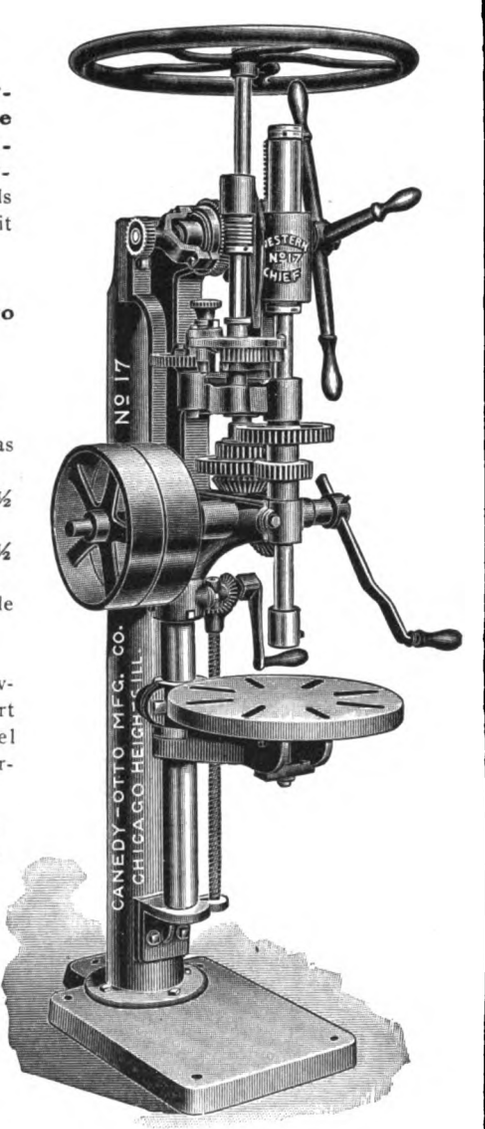
Hand Lever Feed, also Horizontal, Gear Driven Positive Self Feed, changeable instantly to fast, slow or medium speed as desired. These feeds work independent of each other and bit is lifted quickly.

Cut Gears.
Raise and lower device to table

Drills to center of 24-inch circle.
Bores from 0 to 1½ inch.
Takes Bits ½ or 41-64 Shank as ordered.
Spindle has up and down run of 8½ inches.
Table has up and down run of 15½ inches.
Greatest distance from table to spindle 18½ inches.

Wheel rims can be drilled by removing table and using the forked support as a wheel holder. A special wheel holder attachment as illustrated is furnished when desired.

No. 16, Weight 360 pounds
No. 17, Weight 560 pounds





Royal Blower

"The Successful Blower"

Gear case is oil-tight and dust-proof. Gears run in a continuous bath of oil. No spiral gears, worm gears or ball-bearings. Crank turns forward or backward. Fan 12 inches. Weight 135 pounds.

Fire pot is 8x9 1-2x4 inches inside. Needs no Clay.

Some
"Popular Tools"
Made by

CANEDY - OTTO MFG. COMPANY,

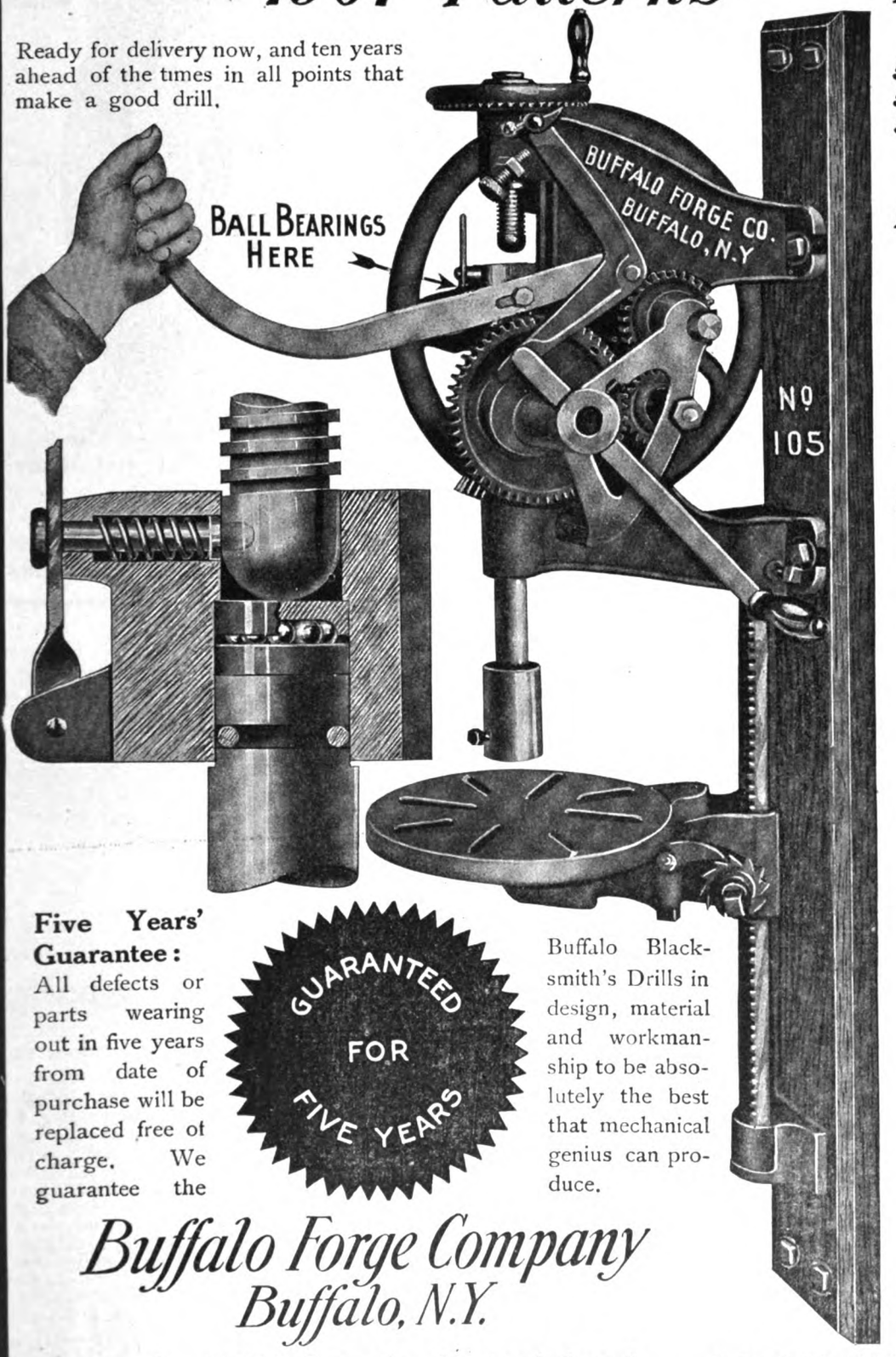
Chicago Heights, Ill.

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EVERYWHERE.

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1907 Patterns

Ready for delivery now, and ten years ahead of the times in all points that make a good drill.



BUFFALO 1907 DRILLS.

5 Sizes
5 Capacities
5 Prices
Send for Photographs

Designs are
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Strong
Simple
Durable
Original
Jig Made
Practical
Symmetrical
Extra Heavy

Features:
Two Speeds
Lever Feed
Quick Return
Slotted Table
Ball - Bearings where they count, on the high speed spindle, ***not*** on the slowly rotating feed mechanism.
No Lock-Nuts to take the thrust – Buffalo 1907 Drills are free from these bygones.
Pin Clutch; Nut Closing Devices avoided.
Combination Lock - Nut, Ball - Bearing & Pin Clutch.
Bearings ***bored*** and ***reamed*** in solid metal, no liners used.

Five Years' Guarantee: All defects or parts wearing out in five years from date of purchase will be replaced free of charge. We guarantee the Buffalo Blacksmith's Drills in design, material and workmanship to be absolutely the best that mechanical genius can produce.

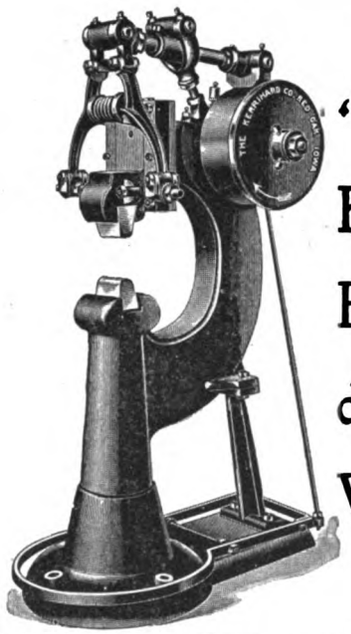
GUARANTEED FOR FIVE YEARS

Buffalo Forge Company
Buffalo, N.Y.

Canadian Buffalo Forge Co., Montreal, Canada.

Buffalo Ball Bearing Drill No. 105.

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"Let the Kerrihard Hammer do Your Work."

The Right Tool at the Right Price

There is a rigid test and a thorough inspection of every part and feature of the Kerrihard Hammer, whereby every possible weak spot is found in the factory and not in your shop.

This practice covers every step from the design and selection of the raw material to the finished product and begets a hammer that is right and stays right.

In it is embodied every modern feature that has proven worthy of adoption and our facilities enables us to present a hammer at a price far below anything approaching it in quality.

An origin, a record and an appearance which sells it almost on sight, a consistent "making good" of every promise quadrupled our sales over last year. We wouldn't mind telling you here just how many we sold only you'd think we were joking. If you want to know what a Kerrihard hammer will cost you, address

THE KERRIHARD CO.,

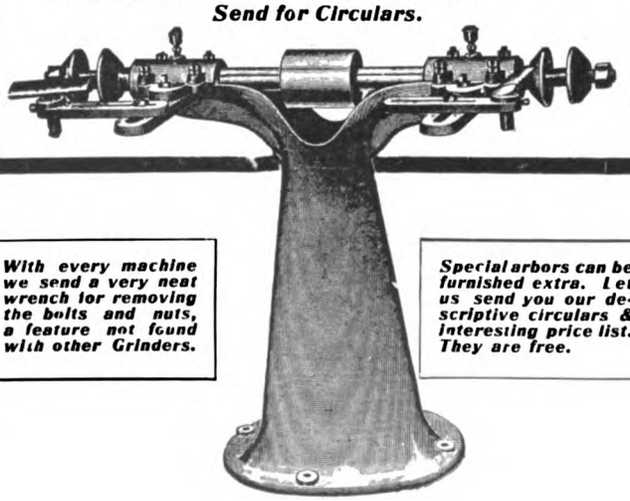
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RED OAK, IOWA, U. S. A.

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is Especially designed for the Blacksmith Trade. Will Carry Wheels 20 in. in diam., 3 in. thick or smaller with 1¼ hole. Price most Reasonable.

Send for Circulars.



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Special arbors can be furnished extra. Let us send you our descriptive circulars & interesting price list. They are free.

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No Threads to Work. No Tools to Buy.

HANDLED by the LEADING JOBBERS.

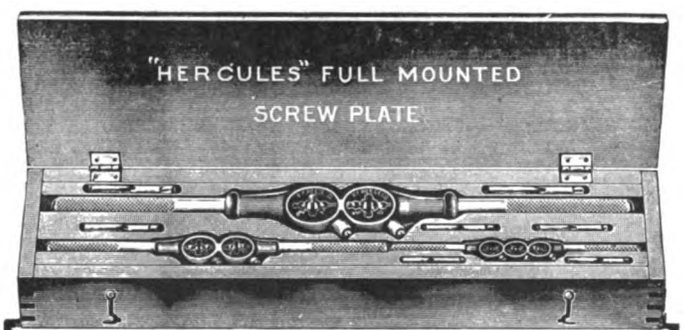
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REECE
HERCULES FULL MOUNTED
SCREW PLATES



WONDERFULLY STRONG **FULLY GUARANTEED**

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Hercules Screw Plates have many strong points that are appreciated by the skilled mechanic. There is no changing of dies because a stock is furnished for every die and dies are always ready for instant use. Double stocks, a new idea of ours. All our stocks have Knurled Handles. The dies and taps in Hercules Screw Plates are the Celebrated Reece kind, fully guaranteed and the freest and most accurate cutting tools made. Hercules Screw Plates are not only the finest in quality, but the lowest in price as well and that's the kind you're looking for. The big demand for our goods enables us to sell at a small profit. The prices we can quote you on first-class screw plates will surprise you. WRITE TODAY for our Illustrated Catalogue and Price Lists. Free to you.

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SOLE MANUFACTURERS

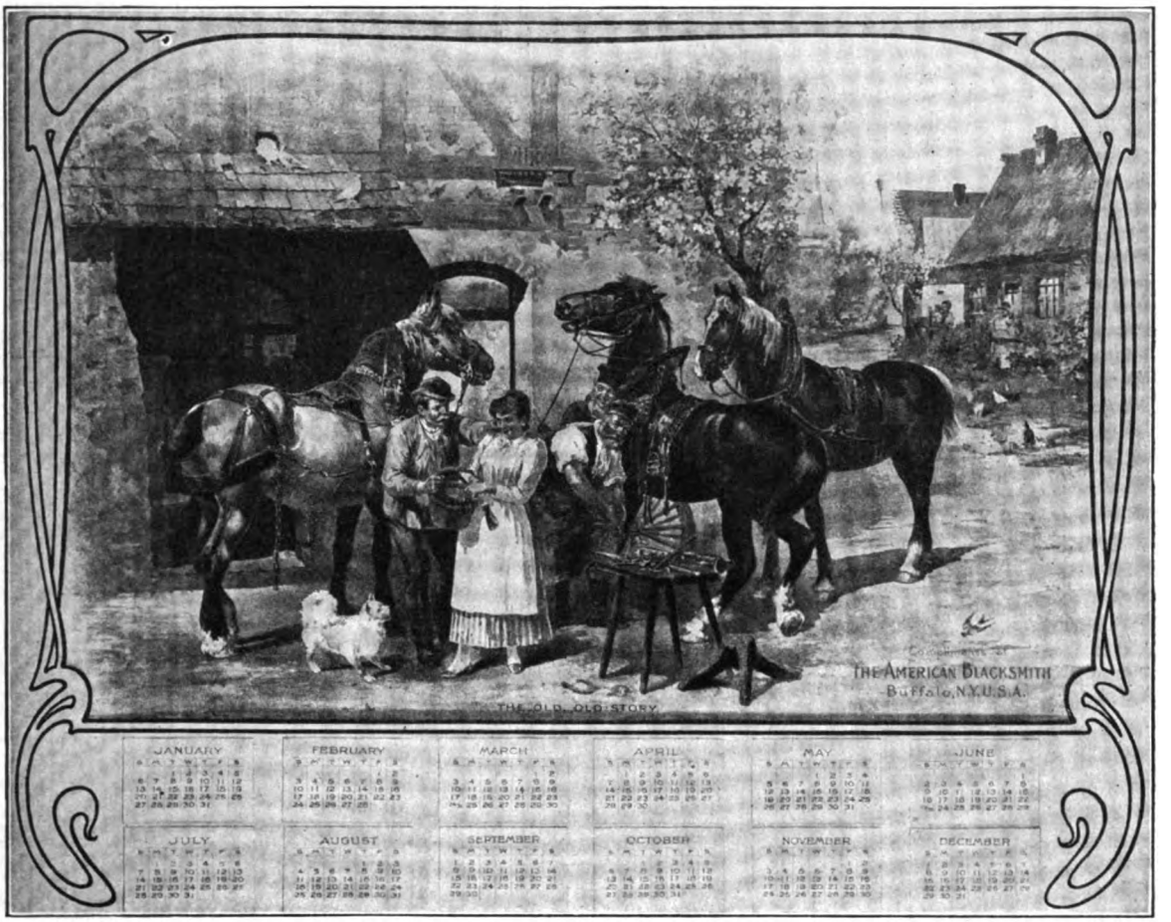
GREENFIELD **MASS., U. S. A.**

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THE OLD OLD STORY

Painted by RICHARD VAN FLEET

An extremely beautiful water-color painting valued at $1,000 and reproduced most artistically in ten colors as an extremely appropriate art-calendar subject



The American Blacksmith controls the use of this beautiful painting until 1908, when art stores will be allowed to sell copies of it at 50 cents each.

But while we control the supply every reader of the American Blacksmith, whose subscription is paid to or beyond January 1907 will be presented with a copy of this beautiful painting in the shape of a most artistic calendar 11¼ by 14¼ inches in size. If your subscription expires before January, make sure of getting one by renewing now.

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An Artistic Calendar is the Best and Cheapest Way of Advertising Any Business

These calendars are offered to SUBSCRIBERS OF THE AMERICAN BLACKSMITH ONLY and to induce readers whose subscriptions expire before January to renew promptly and to take advantage of one of the following liberal offers:

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American Blacksmith Company

P. O. Box 974 **BUFFALO, N. Y.**

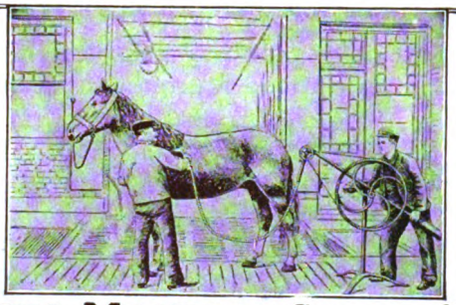
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The Celebrated Gillette Horse Clipping and Grooming Machines

The Guarantee we give you with our Machine is as good as a U. S. Gold Bond

We are so far in advance of other Machines in improvements **that we really have no competitors.** Gillette Machines give satisfaction in every way.

Our claim is as broad as words can make it. The Gillette Clipping and Grooming Machine is **better** than **any other** Clipping and Grooming Machine **in every particular.**



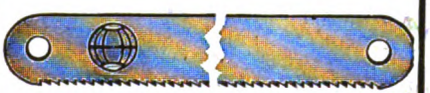
The Gillette Machines were the first Horse-Clipping and Grooming Machines made in any part of the world; many imitations have been put on the market, but none have ever reached our high standard.

Send for our 1907 Catalogue and read about our New Patent Chain and Grooming Brush.

THE GILLETTE CLIPPING MACHINE CO., 114 West 32d Street, NEW YORK, N. Y.

Your Hack Saw Troubles

will come to an end if you get the old reliable Universal brand. Send for our free booklet with hints on the use of the hack saw.



West Haven Manufacturing Co.
NEW HAVEN, CONN.

NATIONAL SELF-OILING STEEL TUBULAR AXLES

Now made of high carbon steel.



Guaranteed to be stronger and more rigid than solid steel axles. We make both. Write us

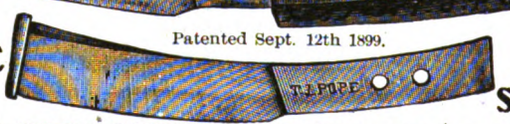
National Tubular Axle Co., EMIGSVILLE, PA.

GENUINE POPE'S FARRIERS' KNIVES



Buy the GENUINE POPE'S

Patented Sept. 12th 1899.



Do not ACCEPT A SUBSTITUTE

The handles of the GENUINE POPE'S KNIVES are now made with the notched end shown above. All such bear the maker's name, T. J. POPE. All genuine Blades are stamped PAT. SEPT. 12, 1899.

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A Good Blower That Blows Everybody Good.



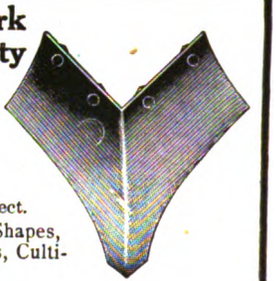
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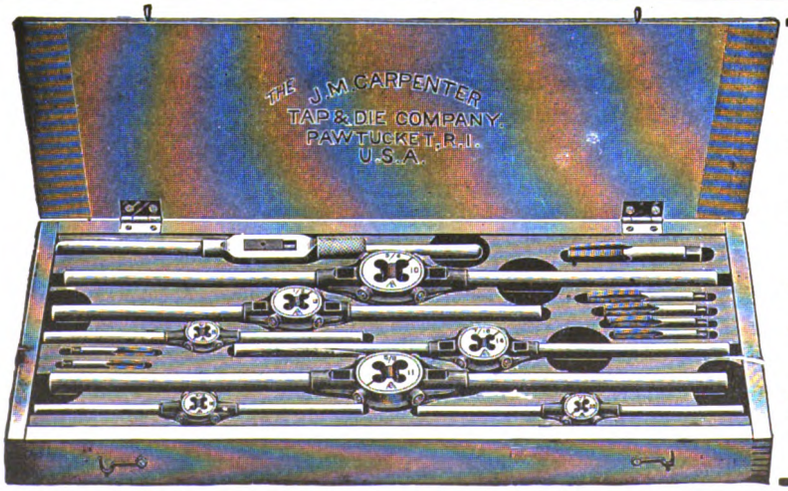


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Pawtucket, R. I., U. S. A.

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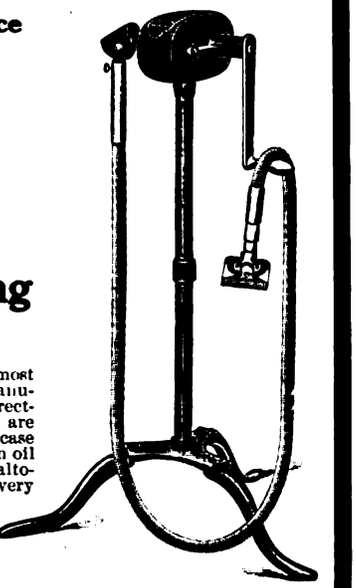
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BUY WHEELS DIRECT FROM THE FACTORY

We can save you money on all sizes of wheels; in the white, painted any color and with steel or rubber tires. We bore wheels for boxes without extra charge. Give us a trial order and we will make you one of our many satisfied customers. Write for special prices to *American Blacksmith* readers.

Carriage Wheel Supply Co.
UNION CITY, IND.

$6.75 Is the Price of This
Genuine Stewart No. 1 Horse Clipping Machine



This is unquestionably the most perfect clipping machine ever manufactured. The gears are all cut directly from the solid steel bar, and are thoroughly enclosed in a metal case where they run constantly in an oil bath. It does away practically altogether with wear and friction. Every part of the driving mechanism is

GUARANTEED FOR 25 YEARS

It has 6 feet of new style light easy running flexible shaft and is fitted with the highest grade Stewart one nut balance pressure clipping knife. It runs easiest of all clipping machines and clips very fast.

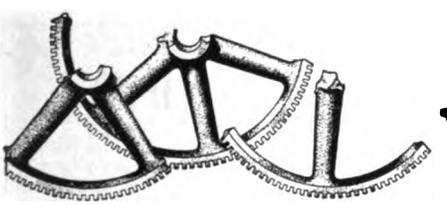
This is a truly marvelous machine. It will pay you to own it if you clip but two horses a year. Order one now. **SEND $2 AND WE WILL SHIP** C. O. D. for the balance.

Our handsome new catalogue, free, shows everything modern in clipping and grooming machines—hand or power. Write a postal for it.

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126 La Salle Ave., CHICAGO.

The Class of Work that WELDARINE will do.

TRADE WELDARINE MARK. REGISTERED.



WELDARINE



BEFORE. **AFTER.**

WELDARINE will braze or weld cast-iron or any form of iron or steel and is the only compound ever discovered that will at all times do this class of work.

WELDARINE can be used in the forge or with a brazing torch. There never has been, there is not now, there never will be anything "just as good" as WELDARINE.

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Wherever Capewell Horse Nails are used they invariably give satisfaction, because they hold the Shoe and, therefore, hold the Customer.

"A Nail a Horseshoer Can Rely Upon."

MANILA, Philippine Islands,
June 1, 1904.

THE CAPEWELL HORSE NAIL CO.,
Hartford, Conn.

Gentlemen:—

I am away off here where there are not many horseshoers that are Americans. Most of the horseshoers here are Filipinos. I have run across some of your nails while working for the Quartermaster's Department, and I must say they are a nail a horseshoer can rely upon to hold on the shoes.

ALBERT C. TOBIN,
Blacksmith, Manila Fire Department,

The Horse Nail that Drives the Best, Holds the Best and is Safest to use is "The Capewell."

PLAIN PATTERN REGULAR HEAD.

PLAIN PATTERN CITY HEAD.

Made by **The Capewell Horse Nail Company**

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The Largest Manufacturers of Horse Shoe Nails in the World.

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Catalogue Free upon Application.

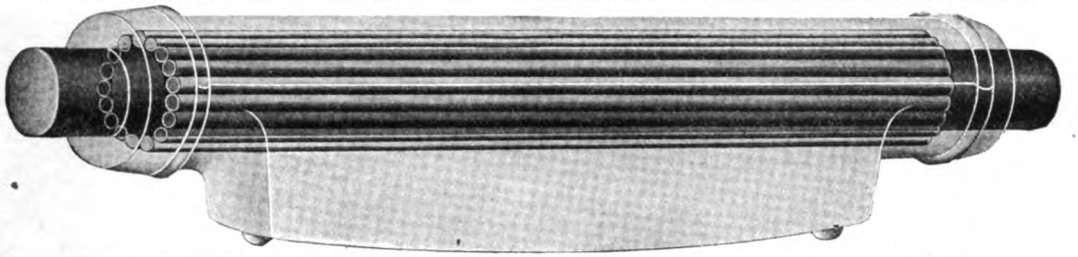


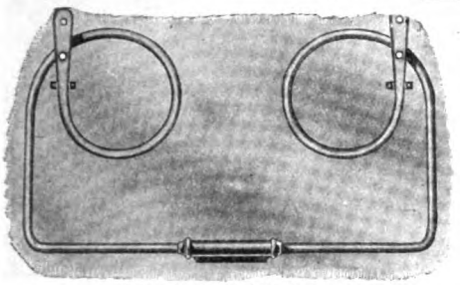
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The Greatest Improvement Ever Made in Vehicle Construction

SCHUBERT BROS. GEARS

EQUIPPED WITH W. S. SHULER'S PATENT ROLLER BEARING SPRING

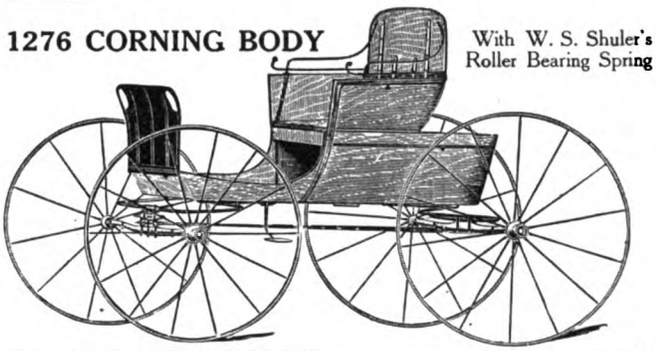




ROLLER BEARING

NO. 1276 CORNING BODY

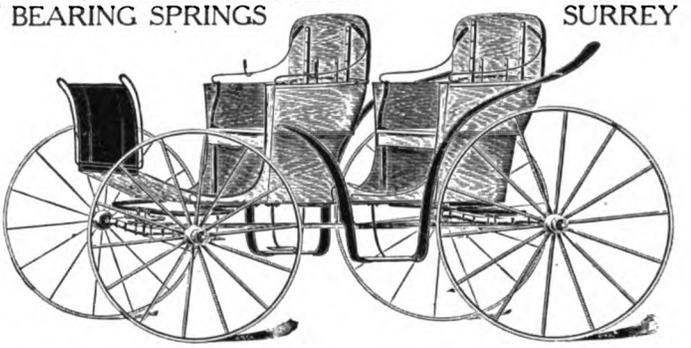
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No Friction, No Wear, No Noise.

W. S. SHULER'S ROLLER BEARING SPRINGS

NO. 1908 SURREY

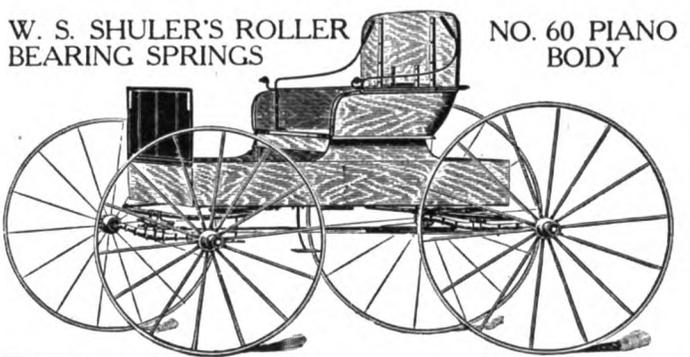


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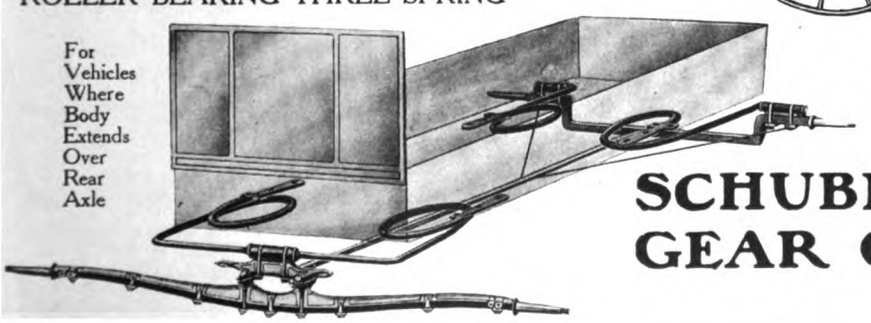
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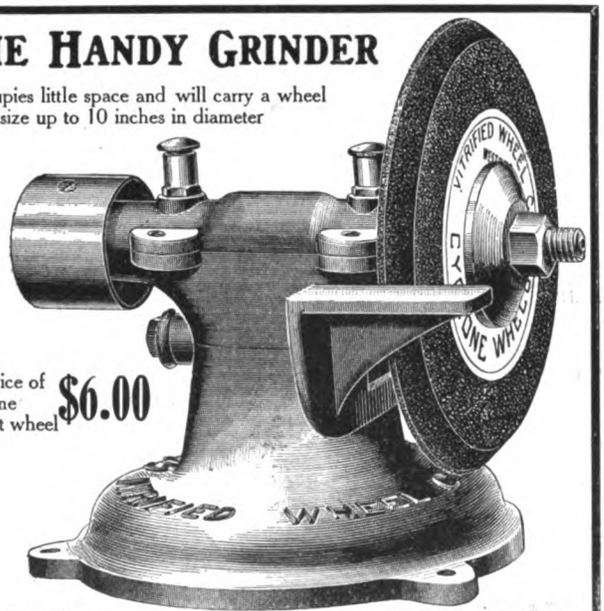
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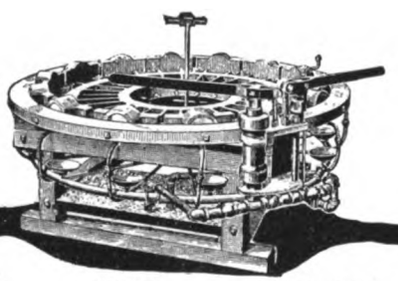
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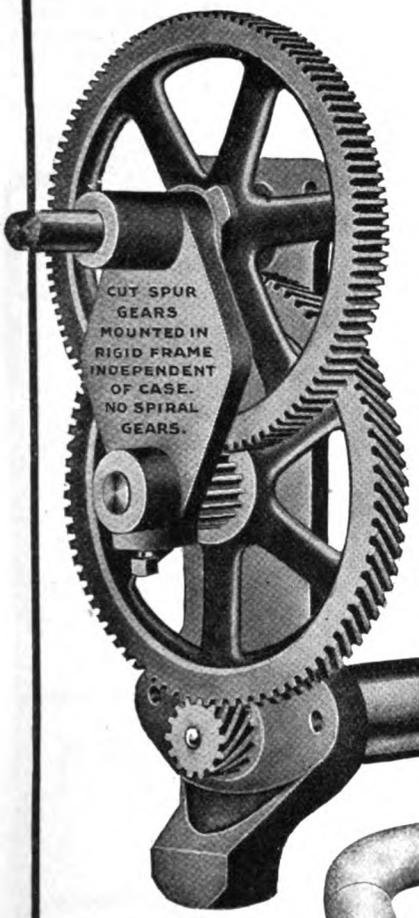
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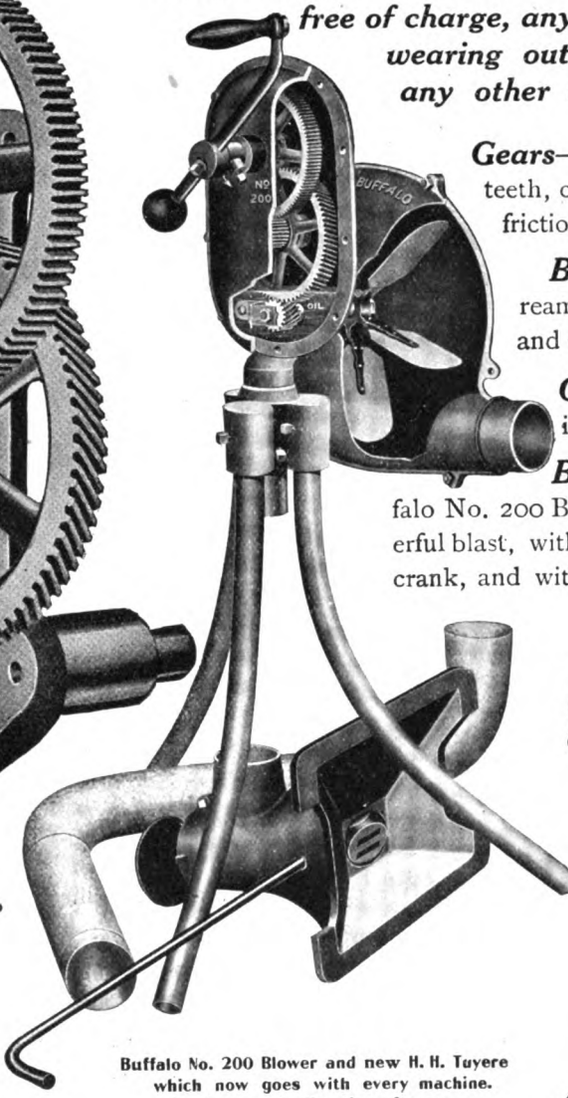
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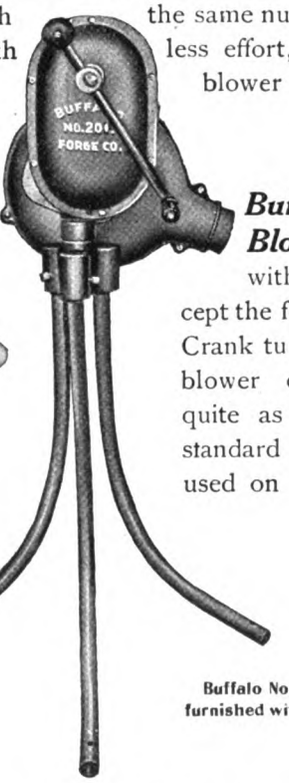
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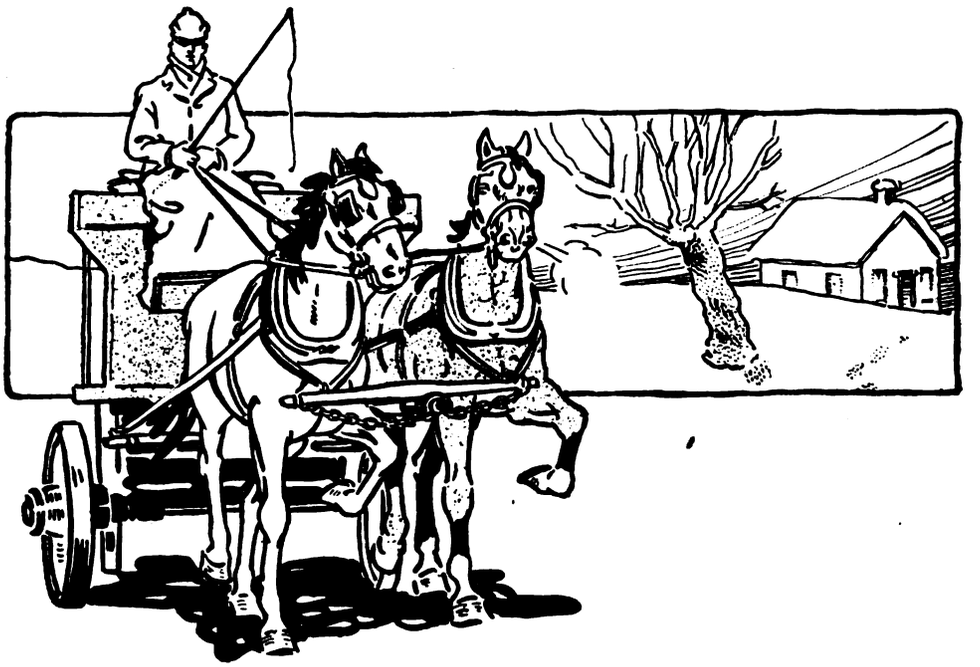
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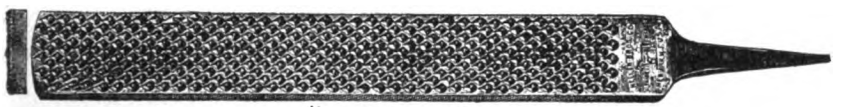
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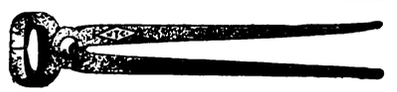
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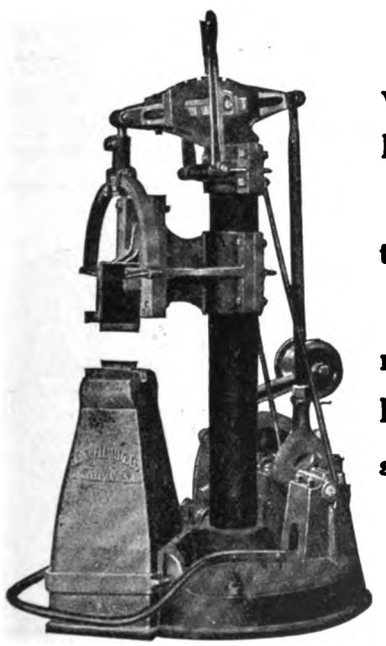


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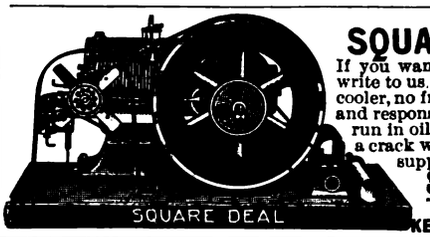
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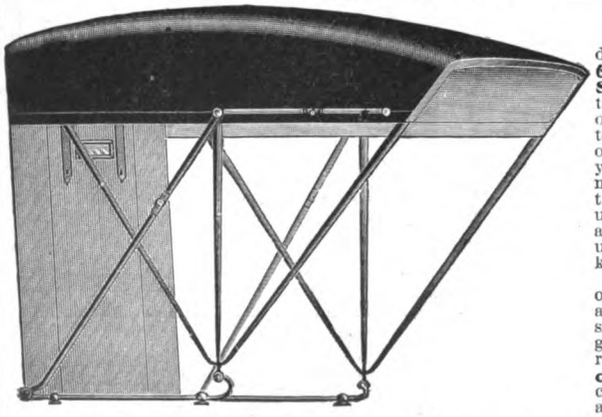
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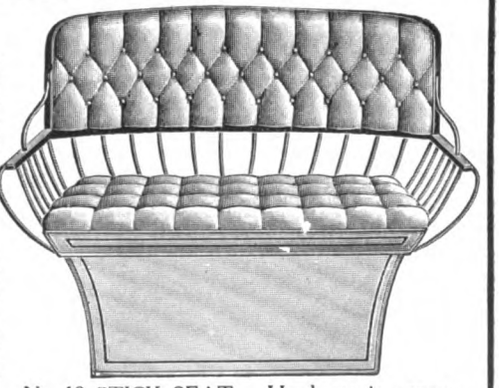
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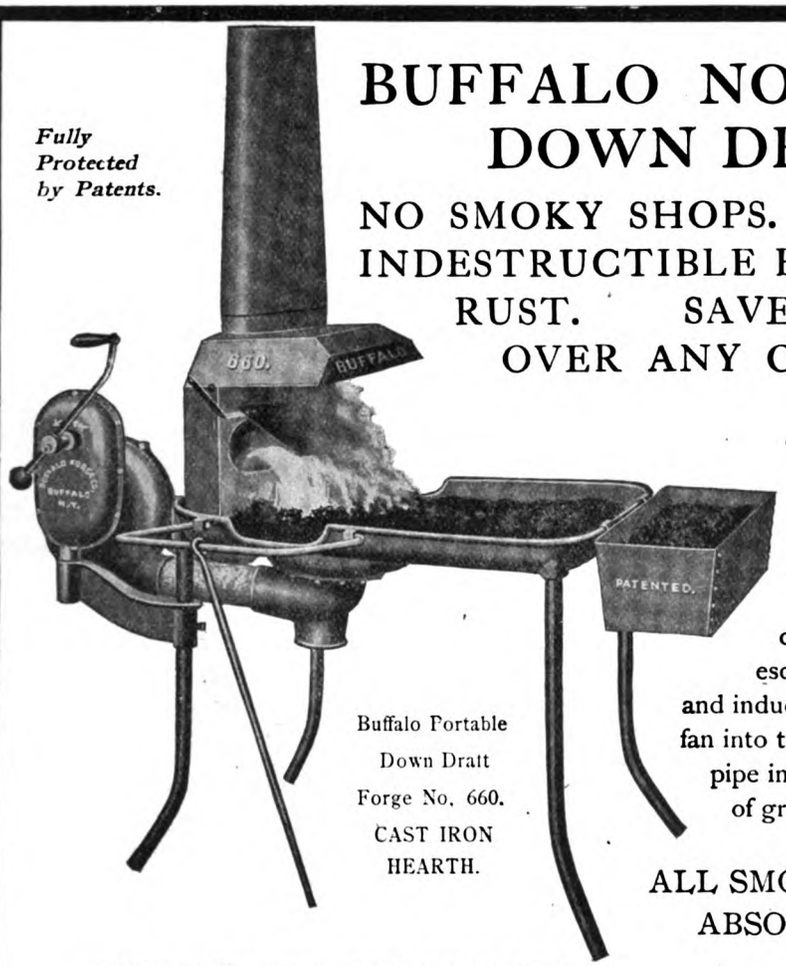
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Patent Applied For.

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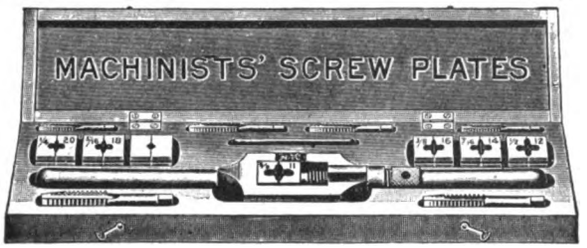
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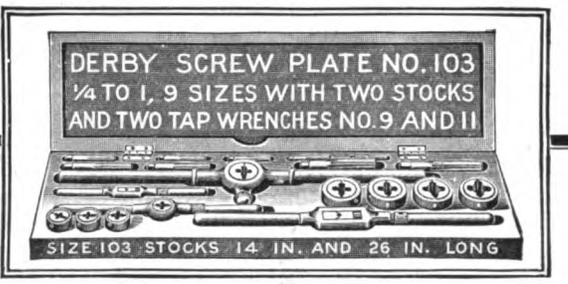
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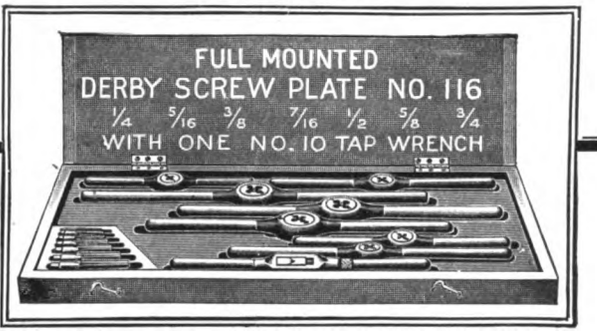
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With this issue starts another new volume and also the sixth year of THE AMERICAN BLACKSMITH. As inspection will show, we present to our readers a bigger, better and more valuable paper than ever before. The articles for the coming volume will be of greater variety, value and interest and several new writers, authorities on their respective subjects, will be introduced to our readers. In this issue it will be noticed that the railroad smith is given special attention. Next month the horseshoer will be accorded this same consideration; in December another branch will be given first place, and so on; every department of the great, old craft receiving extra attention in some issue. But this policy will not prevent us from giving proper attention to each branch in every issue. On the contrary, the four additional editorial or reading pages will enable us to cover each and every department more thoroughly.

Our general policy of publishing nothing but pure reading matter in the reading pages, will be rigidly adhered to, as in the past. Reading pages for the readers; no trade puffs, stale clippings or matter of low standard, and while much of the subject matter for the new volume has already been determined upon we want our readers to ask for articles upon any special subject in which they may be interested. Of course, we cannot publish articles dealing with matters other than those relating to some branch of smith or vehicle work, and such requests should therefore be thus restricted. We also desire more of our readers to take an active part in the discussions. True, interest has not been lagging, but we want every member of the craft to give his ideas on these matters. THE AMERICAN BLACKSMITH is the smith's very own, and we want each and every member of the craft to feel at liberty to write, discuss, praise or complain of anything that appears in its columns.

Contents, October 1906.

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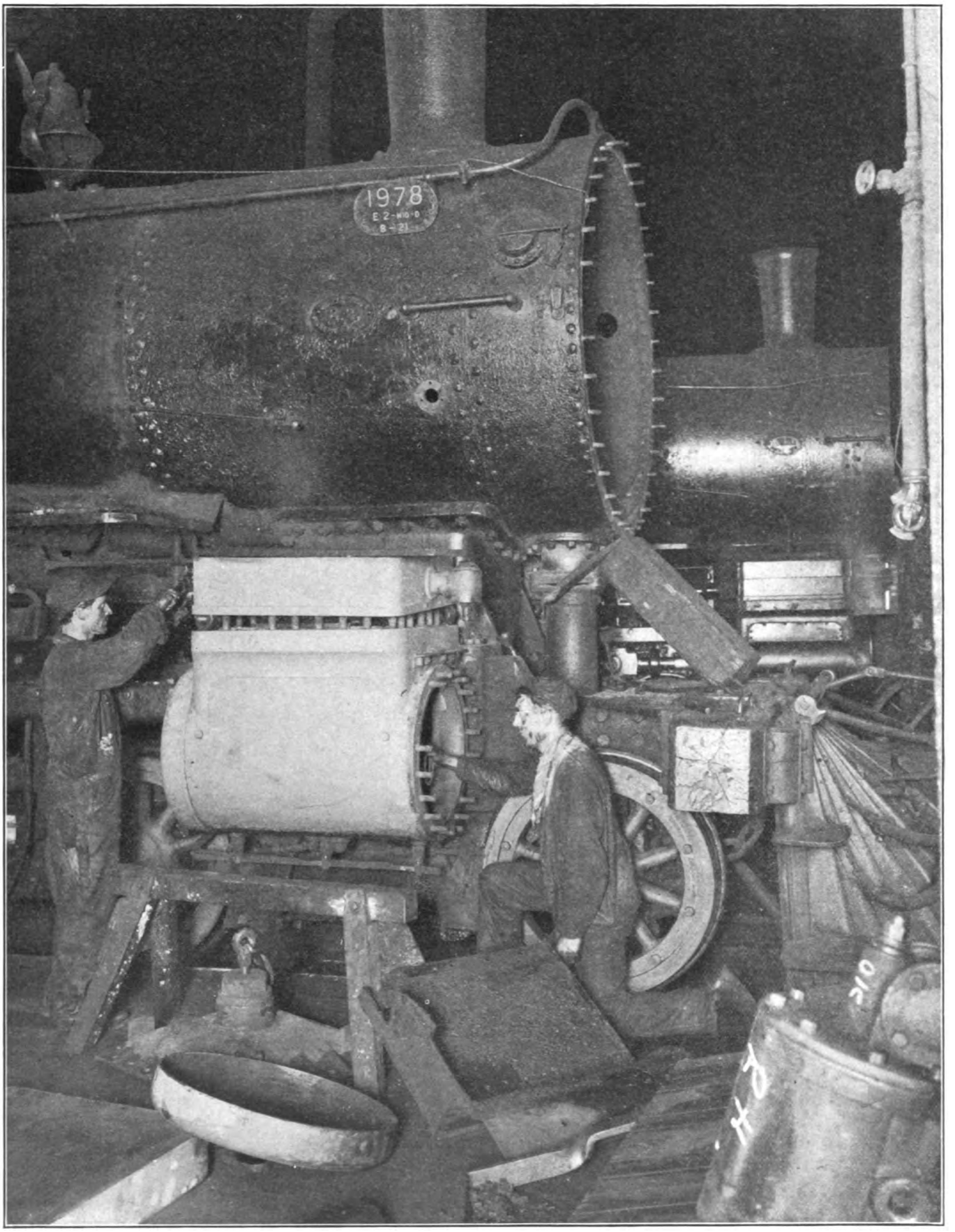
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The "big stick" of our President has received the attention of the press for some time, but did you know that THE AMERICAN BLACKSMITH has a "big stick"—our pink buffalo stamps? Like our President, we insist upon a square deal—fair treatment for our readers, not only from our advertisers but from all manufacturers and dealers with whom they may do business. The popularity of the little squares has continued to increase since their first appearance. Subscribers know that the buffaloes mean something, that the protection is real with something back of it—protection with a big stick if necessary. Get the protection of the big stick by placing one of the little pink buffalo stamps on every letter you write. When your supply runs low send for more. We have a big lot of these stamps and want you to use them freely.

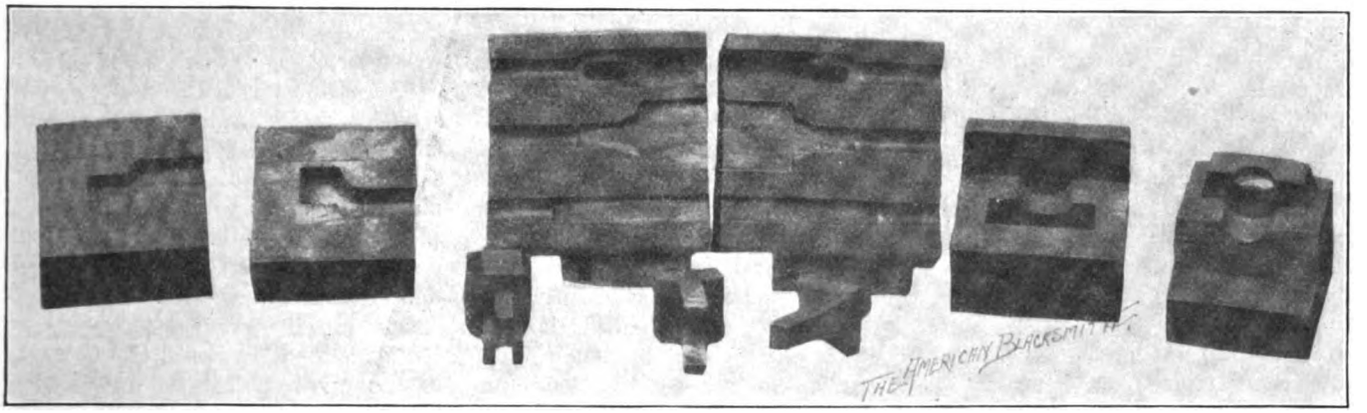
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THE IRON HORSE AS WELL AS THE ONE OF HOOF AND SHOE NEEDS THE ATTENTION OF THE SKILLED CRAFTSMAN

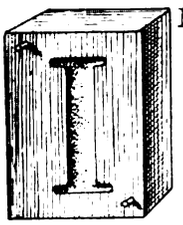
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MADE OF STEEL AND SUBJECTED TO VERY SEVERE USAGE

Forms and Dies for Forming Machines.

T. F. KEANE.



IN taking up the subject of forms and dies for bulldozers, drop hammers, steam hammers, forging machines and bolt headers, I feel that I cannot do justice to it, for it is one that has been tried by a great many and still offers a very open field for discussion. But I will endeavor to illustrate and prove the principal point to be settled, *i. e.*, the most durable and therefore the cheapest material to use for this purpose. In other words, the question of durability and economy of cast iron dies against steel dies. This, by a varied experience, I have settled in my own mind, and I will now offer you my ideas.

First, I will speak of bulldozer work, such as bending arch bars, drawhead yokes, drawhead spring pockets, brake staff rests, centre of corner brackets for car bodies, or any plain ordinary bending where it does not require to be brought up to a sharp square corner. I find cast iron properly reinforced perfectly satisfactory. But when bending up to a sharp square corner, I reinforce or face with steel, this proving to me that in nearly all bulldozer work, cast iron gives perfectly satisfactory and economical results.

In regard to drop-hammer or steam-hammer work, I do a great variety and use steel dies almost universally. I will here offer you a sketch and a little description of the dies used and the work made, showing you a forging made from two-inch round iron taken in the straight piece and upset until we have a rough shaped ball on the end, perhaps three inches in diameter and offset to one side. It is then heated again and put in the finishing dies and shaped as you now see it shown in Fig. 2. This required hard pounding but very few blows. One set of these dies will make perhaps 4,000 pieces before resinking, thus proving that cast iron for this purpose would be worthless and that nothing but steel will do. This I offer as only one out of many different pieces of work which have been done on the drop hammer in which the dies are subjected to a very severe test.

I also have here a sketch of the set of dies and a piece of work called a moving rod jaw made by us in our forging machine and used in connection with the crank spoken of before. This forging we make of 1⅜-inch round iron upset in two impressions in the die to make a jaw about 2½ inches across and 5 inches long. This is split by a pair of knives on the machine; then heated again, put in the finishing part of the die and finished, making a jaw with a 2½-inch head and 5 inches deep. This process is extremely hard on the dies, one pair of these dies having made perhaps 1,000 pieces before being resunk. These dies are made of steel and are subjected to an extremely severe test. This is only one of the many different pieces of work we make where the dies are tried and have to

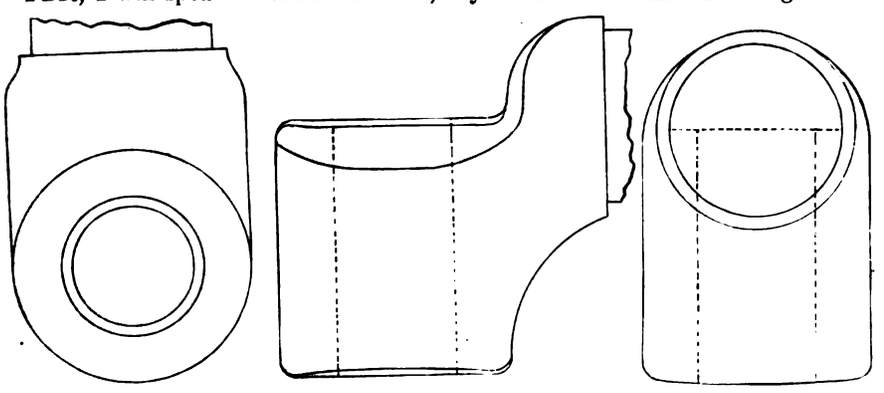


FIG. 2. FOUR THOUSAND OF THESE PIECES ARE PRODUCED FROM ONE SET OF DIES BEFORE RESINKING

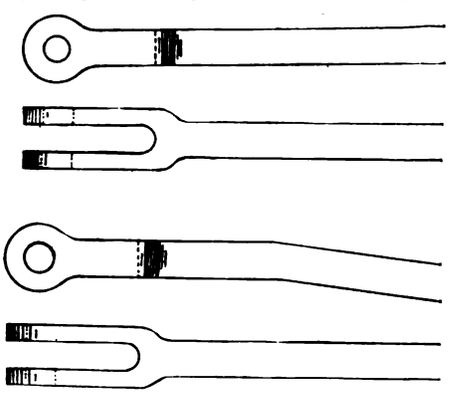
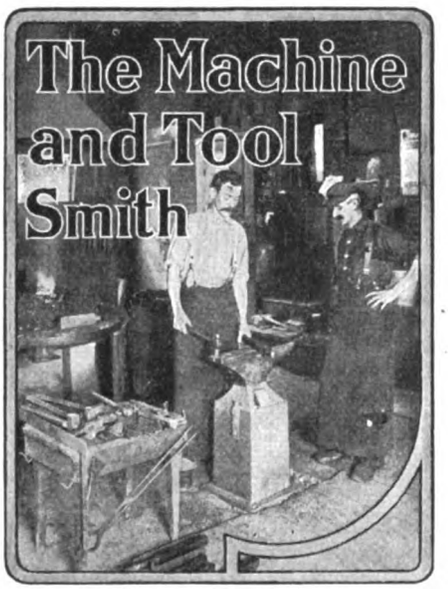


FIG. 3. HARD ON THE DIES, WHICH PRODUCED ONE THOUSAND PIECES

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stand a very severe test, thus proving that anything with the exception of steel would be absolutely worthless.

I will now take up the bolt heading machine, on which I do a large variety of work, and in which I use dies with soft steel back and cast steel front. I find that nothing else gives satisfaction, thus proving on a whole that whenever a die is subjected to a severe test in my estimation, nothing but steel will furnish durability, which means economy, and economy is our main object.



As dead coals require more blast than is good for steel, always use a fire of new coals for heating this metal. And use charcoal as it is best. M. A. CASE.

When annealing in water, heat the steel to a very dull red and then cool in soapy water. This gives very good results, but is of course not to be compared with more favorable methods of annealing. F. G. F.

When the piece is laid under the steam hammer, lower the hammer lightly to gauge your work. If not in proper position you can soon feel and see it. When in proper position let your hammer strike the work with heavy blows if these are necessary. H. BERRY.

Never pack tool steel in any kind of bone when it is desired to anneal it. Bone contains phosphorus and this will injure the steel. It makes the steel brittle and is one of the impurities which the manufacturer endeavors to entirely eliminate from the metal. F. C. CARPENTER.

A Practical Talk on Flue Welding.

G. H. JUDY.*

In the operations of welding, shouldering and expanding flues our first aim should be to get a solid weld. This is the most important of all operations. In regard to shouldering or expanding, there is no question as these operations are worked from the solid end and need no special care but to get to the sizes. The welds on the other hand, must be solid. If they are defective and show a leak after being put in the boiler, the flues must be taken out and all work gone over again. This doubles the cost on every flue that is defective, not counting the delay of holding the engine out of service, which is often an item of no little consequence.

The second point is the output. To get a good output a fair day's work is what is required in order to hold a good record, and satisfy our company and keep our shop up to or ahead of any other shop, we should get a good average days work every day. We do not consider those grand stand plays made on exhibition and made to show what can be done by the different kinds of tools and furnaces to be a fair average, for the work done on those trials is not up to the standard of what we must do right along day after day.

We have seen some of those tests but they did not show a good quality of work. Great speed or how fast a furnace would heat and how fast a certain machine could weld flues regardless of quality was demonstrated.

Some shops after the flue is cut off, scarf the flue and safe end by machine back about ½-inch to a thin edge and then weld. Other shops scarf under their welding machine and then weld both the safe end and the flue. This practice has been followed for years. A great many shops of today have abandoned the method of scarfing either the flue or safe end as an operation, but when the flue and safe end are cut off they are cut by a disk or round cutter, beveled on one side and straight on the opposite side, so that when the flue or safe end is cut, it leaves the end beveled ready for welding. This does away with the expense of scarfing.

For welding the flues and safe ends cut in this way, a tapered mandrel placed along side the welding furnace is used. The helper puts the flues right from the cutter into the furnace, gets the end hot and shoves it up on the mandrel. This opens out the end. He has his safe end lying in the furnace. He now returns the flue to the furnace and pulls the safe end back into the flue and continues to heat for the welder. The furnace having two heating holes, the helper keeps the flues ready for the welder as fast as he welds and shoulders. On an ordinary safe end he welds and shoulders at one heat. This method of cutting the flues leaves a short bevel or scarf and when put together makes a nice solid weld. The fact that you have plenty of metal right through the weld and you must work the metal in and down to size makes a good job.

One thing I want to call to your attention is the cross bar at the back end of the furnace. This is intended to jump or upset the flue against when it is hot before taking it to the hammer or welding machine to be welded. This is important as it puts the safe end back against the flue and upsets it where it is welded and this is where you need the material. Some flue welders seem to be in a hurry and do not take the time to jump the flue when hot against this bar. We do not think this is good practice as we believe flue work should never be slighted in any way.

It seems to be the custom in some shops to have the rattler or cleaner in some out-of-the way place, while the cutting-off machine is in another place not very convenient to the welder. This causes the flue to be carried from the truck to the cleaner or rattler, and from the rattler to the cutting machine, and after cutting carried again to the welder, and very likely from the welder back to the cutting machine again to be cut to length. All of this carrying is costly and unnecessary, if it can be avoided. The new plan and a good one is to place the flue shop in line with the rattler which is at one end of the shop and high enough above the ground so that the flues when rattled can be

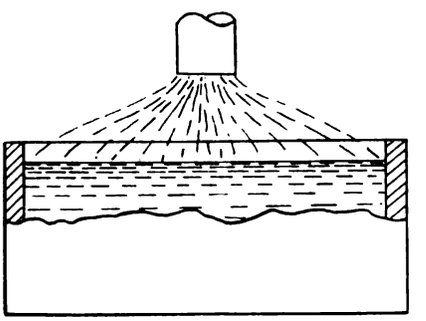


FIG. 3. THE SPRAY PRODUCES A VINE-LIKE APPEARANCE ON THE STEEL

dropped out from under the rattler and rolled to the flue cutter on inclined rails. When the cutter cuts them and drops them down they then roll to the welder. They are then welded and shouldered and dropped down and rolled to another

* This and also Mr. T. F. Keane's article were read before the I. R. M. B. A. Convention which met at Chicago, Illinois, August 21, 22 and 23

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cutter who cuts them to length. Then they roll to the expander, if you expand them. All done and not one carried or costing a cent for portage through the flue shop. This flue is not even turned around, but goes straight through to a finish, there being two cutting machines, one for each end of flue; one placed close to rattler, and the other placed after the flue leaves the welder. No person touches the flue after the rattler is opened so far as portage is concerned until the flue is carried to the engine, it being handled only when cutting and welding.

Hard coke has been the only reliable fuel for heating flues, but it has seen its day as it costs too much to handle it and we lose too much time in cleaning the furnace and wheeling out the ashes, and the output is too small. Fuel oil and natural gas are doing great work both in quality and output.

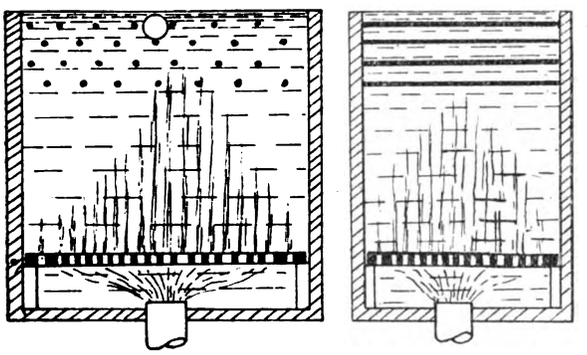


FIG. 4. THE WIRES CAUSE ALL PARTS OF THE PIECE TO COME INTO CONTACT WITH THE LIQUID

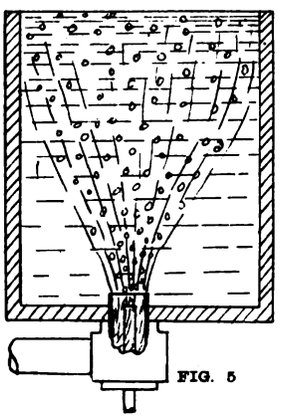


FIG. 5

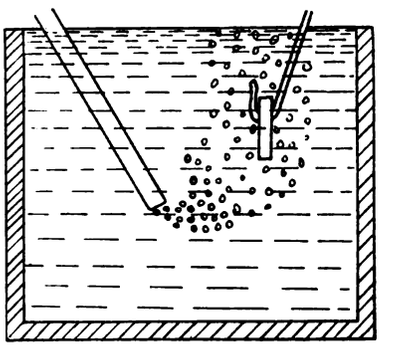


FIG. 6. A BLOW PIPE MAY ALSO BE USED TO INJECT THE AIR

Hardening and Tempering Steel.—12.

E. R. MARKHAM.

Case Hardening.

When it is desired to harden many small pieces and produce nice colors, they may be polished and the surfaces cleaned of all grease and dirt. They should then be packed in charred bone and subjected to a comparatively low heat—not above a good red—and, unless a bath with special provision for agitating the work is at hand, the work should be sifted slowly out of the box provided it can be done without the air coming in contact with the work. The better method consists in having a very deep bath with wires running across as shown in Fig. 4. These wires are so arranged that the work bounds from one wire to another as it descends, thus keeping it revolving and all parts come in contact with the water. Striking the wires also tends to dislodge any particles of bone that might cling to the work and produce poor colors at this spot. It is never advisable to allow the air to come in contact with the work and for this reason the box should be held as closely as possible to the water. Yet much nicer colors result if the bath is so constructed that air may be injected into the bath. This may be accomplished by using an inlet pipe having an air pipe in combination as shown in Fig.5. The air coming in contact with the work while it is under water produces elegant colors provided other conditions are favorable. Extremely hard water in a bath does not favor nice colors and for this reason water from driven wells is many times found utterly unfit for work of this character.

When hardening a few pieces by heating and covering the surface with cyanide of potassium, nice colors may be produced by taking a piece of small size gas pipe and blowing into the water so the work will pass through the air from the pipe as shown in Fig. 6. It is of course necessary to have the surfaces of such pieces nicely polished and thoroughly free from dirt.

Many times the uninitiated wonder at the beautiful colors on gum frames and similar colored work. This is accomplished by heating the work, attaching it to pieces of wire and submerging it in a crucible of cyanide of potassium heated red hot. The work is allowed to remain until the carbon has penetrated to the depth desired. Then the pieces are taken one at a time and dipped in a bath of clean water. The beautiful vine-like appearance is produced by having the water enter the bath from a pipe that is several feet above the surface and whose end is so arranged that the water leaves it in a spray as shown in Fig. 3. The work is first passed through the spray and then finally it is plunged into the tank of water.

If a large cast-iron crucible is used to hold cyanide, the work may be suspended all around the edges and as fast as a piece is removed and hardened another may be put in its place. When using cyanide of potassium the utmost caution should be exercised as it is a violent poison. Under certain conditions it is desirable to produce the colors mentioned above and yet leave the surface soft. This may be accomplished by using what is known as 50 per cent. fused cyanide instead of the commercial quality.

To return to the box method of case hardening; it is often desired to have the hardened portion resist a shock or blow. It may be made fine grained and tough and strong by carbonizing at one heat, which should be high in order to hasten the carbonizing operation. The work may then be allowed to cool off and then reheated and hardened the same as if made from tool steel. While the expense of hardening is slightly increased the quality of the work is much improved. When not necessary it is folly to pursue this course, but when the regular method would not give the desired results then this method proves most valuable.

It is desirable many times to give tool steel cutting tools which are to run at high rates of speed a very hard surface, and leave the interior extremely tough. This is accomplished by packing the pieces in charred leather the same as when packing for case hardening, only bone must never be used in connection with tool steel, as it contains a high percentage of phosphorus and phosphorus will cause the steel to become brittle and consequently unfit for edge tools. When tool steel is hardened this way, the heat must be low, never above the refining heat, and when the articles have been subjected to heat for the

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proper length of time, they may be removed and dipped in raw linseed oil and hardened.

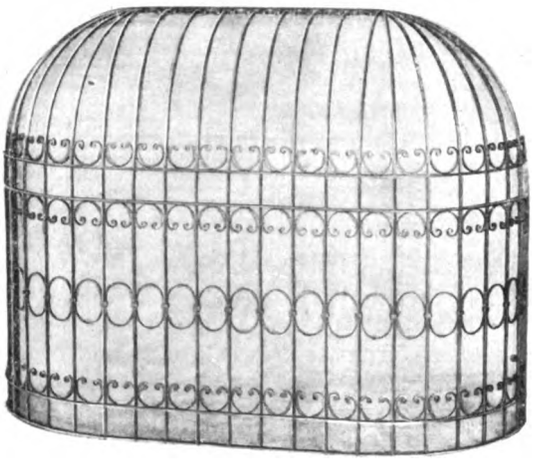
In some shops many dies, milling cutters with strong, heavy teeth, and many similar articles are made from a good grade of open hearth steel and hardened by packing with charred leather and running several hours at a low red heat, then dipping them in raw linseed oil and working them around well until the red has disappeared. They may then be lowered to the bottom of tank and allowed to cool off. Unless the teeth are slender, or the tool is to be subjected to unusual strain it will not be necessary to draw the temper.

(To be continued).

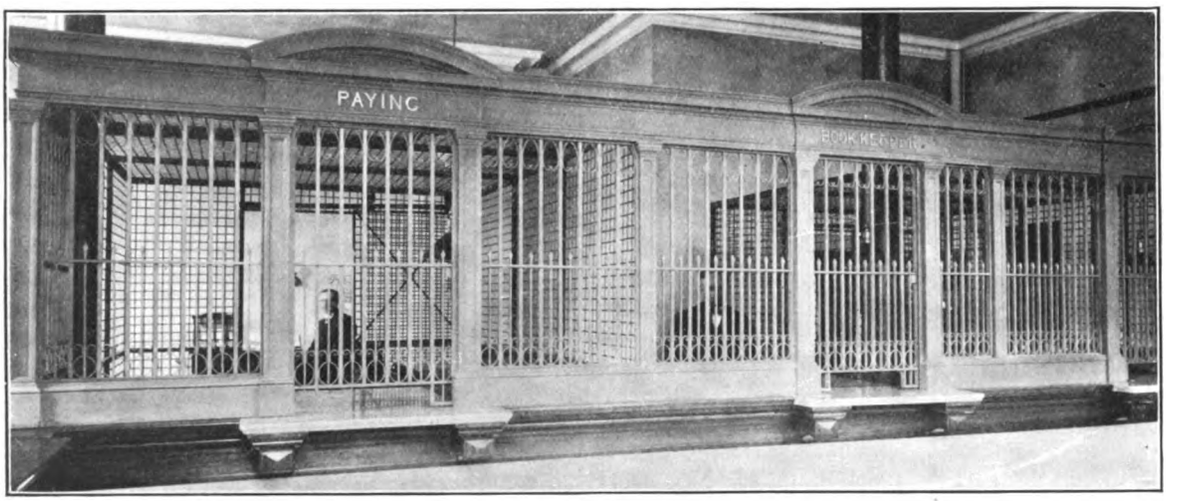
A Wrought Iron Fire Screen and a Bank Grating.

Wrought iron as an ornament for the drawing room and public building gained much favor in the past few years and as a consequence many smiths, especially adept at fashioning lamps, andirons, fire sets and such like, are devoting their entire time and energies to the forging of ornamental work. And without a doubt it pays them well. Should the ornamental worker have ability to draw and design, he can easily show his customers just how his ideas will appear when executed. Of course, the specialist in ornamental wrought work must have artistic taste and an understanding of the fitness of things, in other words harmony. He must see quickly when things are at "needle points," or not in harmony.

The engravings of ornamental work shown this month are very pleasing. The wrought-iron fire screen is very handsome. The pattern is neat and attractive and shows how effective a piece can be made with practically nothing but straight bars and ovals. The bank grating is another example of this work and while it presents a plain appearance it is still very neat and artistic. It will be noted that the shorter bars of this grating are slightly flattened at the tip to represent a spear-like point. The light stock for ovals and curves is used very effectively. Both the examples of ornamental work shown this month are from the forge of the J. E. Bolles Iron Works, of Detroit, Michigan.



A WROUGHT IRON FIRE SCREEN PRESENTS UNLIMITED OPPORTUNITIES FOR ORIGINALITY



A PLEASING GRATING ADDS MUCH TO THE ATTRACTIVENESS OF AN OFFICE

The Farm Wagon Situation.

E. W. M'CULLOUGH, SEC'Y
N. W. M. A.

For several months those interested in manufacturing, jobbing and selling farm wagons have been watching the steady increase in the prices of iron, steel, lumber, castings, forgings, bent-wood. In fact no material of importance entering into wagon construction has escaped and the question with the wagon manufacturer has been, "How soon will I be compelled to advance my own prices," and from jobber and retailer come the question "When are wagons going up?"

The producers of iron and steel are so crowded with orders that regardless of prices, specifications must be placed months ahead to insure shipments—this has been one of the most annoying causes of delays in wagon shipments this season. It is perhaps true in some lines of manufactured materials that part of the advances made are due to the very human tendency to "make hay while the sun shines," but it must be remembered that only in a limited number of cases does even the producer of these materials control what to him is his raw material, consequently, this fact and the known scarcity of labor has caused a natural and unavoidable increase in cost.

The wagon manufacturer for several years past has been placed in a most uncomfortable and unenviable postion of having had to pass up to his trade several small advances owing more especially to heavy and rapid advances in timber cost—in fact, the situation concerning certain species of hardwood became so alarming that associations have been formed to co-operate with the government in seeking means for their protection and preservation.

The jobber and dealer seems to have shared the timidity of the manufacturer in passing on to its proper destination these legitimate advances, so that the situation may be fairly summed up, that the manufacturer has taken care of so much of the advance in materials and manufacturing costs, that he can no longer absorb more of it—the job-

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bers margin because of the same practice and increased cost of doing business cannot be farther decreased. And the dealer in many cases is even in worse shape because of having absorbed out of his profits all, or nearly all of these advances during the past three years. An adjustment can and must be made by these parties in common interest as each have arrived very near the line that separates profit from loss.

A common business fallacy is that decreasing the percentage of profits can be met by increasing the volume of business and no doubt this is true up to the limit of the maximum of legitimate demand and this has been the excuse for the enlargement of vehicle and implement plants during recent years rather than any justification in the amount of profit. The limitations to this policy are soon reached and any candid manufacturer will admit that under normal conditions the present capacity can meet all the requirements.

The anxiety that extends from manufacturer to jobber, to dealer, and to consumer is without cause. For six years, generally speaking, this country has produced bountiful crops, at a lower cost than ever before, for which good prices have been paid by the consuming public without protest. The farmers' land has increased in value so rapidly that cases of one hundred per-cent increase and even more are not unusual. This year of 1906 has broken several crop records for bountiful returns. Do you know of any good reason why he should not out of all this prosperity and blessing pay his share of tribute to good times by settling with his friend the smith and dealer, this necessary increased cost of producing a good farm wagon the next time he buys one? An advance of ten per cent. on the present retail price of wagons will not give the dealers who have absorbed past advances a fair margin of profit but it would be helpful. To the manufacturer and jobber remains the task to take the initiative and before the present month closes the necessary adjustments in prices will be made.

The question may be raised as to whether present values of wagons are not inflated and that in a few months costs may decrease and lower prices prevail, so it would be unwise to place orders now for later needs. It hardly seems reasonable to expect that the forward movement in all lines of business will be suddenly checked from any cause and with the present immense crop to move and dispose of we have reason to look forward, not backward.

Farm wagons are almost guaranteed against decline because of the conditions that surround the supply of wood materials of which the wagon is so largely composed, in fact we may fairly expect prices of this material to still advance. The modern equipment of most factories is such that little further saving may be looked for in that direction and labor values are likely to continue as now as long as these prosperous times continue. The farm wagon at once the most useful and profitable and least expensive of all the farm equipment is deserving of better treatment.



Don't narrow the heel of the shoe. Leave them wide open, give the foot and frog a chance. A wide open heel on the shoe, means a fine, open foot. Don't open the heels with the knife—better not touch the foot at all if you have this habit. F. L. BLACK.

A hoof-liquid which is excellent for tender or hoof bound feet is made as follows: Take one-half pint of linseed oil; 6 ounces of oil of tar; 4 ounces of turpentine and 13 ounces of origanum. Mix these, shaking the mixture well and apply around the top of the hoof. G. E. R.

When driving a nail hold it in the fingers as long as possible in the direction in which it is to go. Pay attention to its sound and the resistance with which it is meeting, but put enough force into your blows to drive the nail—don't do any timid tapping nor drive the nail in without fear. J. B. A.

A thousand different horses have a thousand different sets of feet. No two cases are exactly alike. We must study the individual animal, its feet, build conformation and get-up, if we are to make a success of horseshoeing. There are of course certain principles which we must understand and we should grasp every opportunity to strengthen our knowledge of the foot. A. R. STUMM.

Consider the old shoe—its evidence is unimpeachable. Don't disregard its valuable pointers. Note how it has worn—where it "breaks over"—its thin parts—its thick parts—study it and make use of its teachings. How much it can tell you if you will but observe! How it will show you just what kind of a shoe to put on in its place! Don't attempt to reshoe the animal until you have paid your respects to the old shoe. OLD ONE.

The Science of Horseshoeing.

E. E. HURRELL.

Most of us are aware that the present systems of horse shoeing as generally understood is open to much criticism. To fully understand the underlying principles of the science, we must know the comfort we are able to give the horse by perfectly balancing the animal's feet. Perfect equilibration embraces three important subjects; balancing, symmetry and leveling. If one of these are neglected while shoeing a horse, we immediately turn on the power which leads to all irregularity of action and disease. The horse's foot is equally as sensitive as the most delicate scales. It must be borne in mind that, when the foot is thrown out of its natural position, the horse has to place his foot so as to obtain his balance. He will knock his legs to pieces and suffer torture for years to obtain this balance. All cases of unbalanced feet may be discovered by the horse pointing his foot. This is a language by which the horse tells us all his foot ailments. It never tells a lie. At times lameness is so slight that it would be impossible to discover it if we could not read the language of pointing. We have had several cases of lameness come under our observation when the horse was a complete wreck. If we observe the cases closely it will be found that these animals have completely lost their natural oblique articulation. When a horse gets in this state a change usually takes place. They become knee sprung or cockle jointed, as this brings them to very near their natural position and gives them great relief.

This reminds me of the old practice of feeding a spring-kneed horse on the ground to give him relief. This is quite true provided he is suffering from too high heels. But if the opposite, the animal will starve to death rather than endure the pain, because the high heeled horse obtains a more natural formation by bending over while low heels increase his malady and cause him more pain. The laws of pointing are very noticeable here. The high heeled horse points backwards while the low heeled horse points forward. Next comes the unfor-

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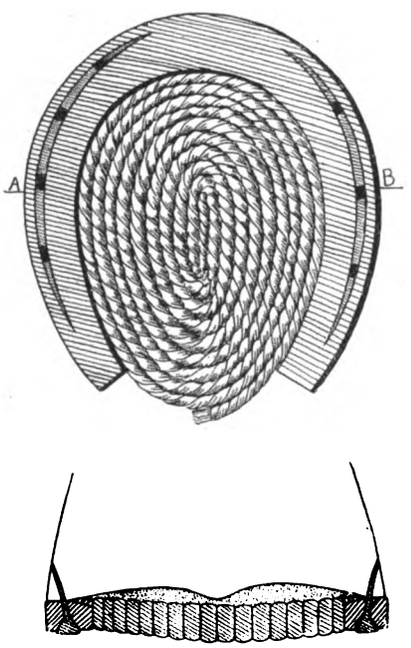
tunate creature that has not acquired the attitude of bending his legs to obtain relief. The animal has a disease known to the veterinary profession as "Sweeny" and to others as chest founder. Whatever the malady is, it will be noticed that when this animal is placed on soft ground he will dig the ground until he gets the articulation correct. And when a shoe is applied to put the horse in the same position the malady is immediately cured.

A Shoe to Prevent Slipping.

GEO. C. VEDDER.

For many years past, different kinds of horseshoes have been tried for the prevention of slipping on damp wooden or asphalt pavements. They have been provided with grooves and with special calks or have been covered with a coating of rubber with a rough surface. But none of these has worked out well in practice because either inadequate or too expensive. It is necessary to find an efficient method applicable to the usual form of shoe which would be cheap enough to be within everyone's reach whether the owner of a single animal or of a fashionable turnout.

The accompanying cuts show an invention which, though I cannot from



THE SMITH'S THOUGHTS WILL SOON TURN TO NON-SLIPPING SHOES

personal knowledge vouch for its entire practicality, seems to possess the necessary quality of cheapness. It consists of an oval coil of tarred rope whose edges are fitted between the hoof and the shoe in such a way that the hempen sole and the shoe form together a flat surface. The inventor, a citizen of Buenos Ayres, Argentine Republic, South America, claims that in addition to being durable, on account of the tar used it also protects the horses foot from thrush and other similar infections and does away with injuries due to stepping on nails and sharp objects.

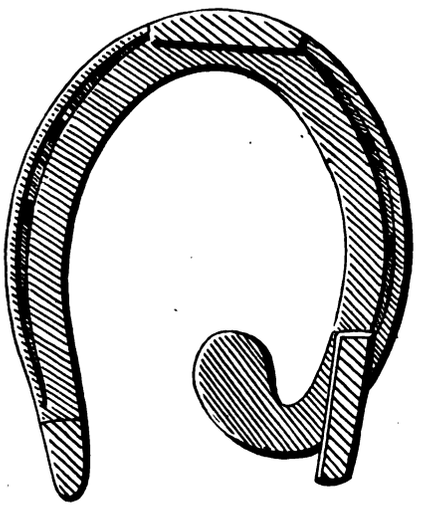
Figure 1, shows the finished sole fastened in position and Fig. 2, a cross section at the line A-B of Fig. 1 showing the position of the coil on the hoof. This invention is said to be coming into use in all of the large cities in Europe; Berlin, Paris, London, Vienna, etc., and if this be so it is surely worthy of some notice by horseshoers in the United States. Perhaps some English reader of THE AMERICAN BLACKSMITH can tell us something about the use of this device on the other side.

How to Cure Corns Successfully and Scientifically.

JAMES N. NEVILLS.

Corns are divided into three classes: Dry corns, suppurating corns and chronic corns. To explain all would mean quite a lengthy discussion but we will take up the latter, chronic corns. In this case there is a vivid discoloration of horn in all possible hues. The horn is either soft, moist, and lardy, or crumbling, cracked, and at times bloody. The inner surface of the horn has lost its normal character and is covered with horny swellings or nodules. Sometimes the wing of the os-pedis (pedal bone) on that side has become enlarged and loosened; a short, cautious gait alternates with well-marked lameness; the latter appearing whenever the shoe presses too firmly on the corn or when the hoof becomes too dry.

The proper treatment is to first remove the causes, by restoring the proper form of the hoof through shortening a toe which is too long. (This is especially liable to be the case in acute angled hoofs). Cut down the quarters which are too high, and carefully remove all dead horn from the branches of the sole. Deeply digging out a small area of blood stained horn is injurious. It is much better to thin the entire branch of the sole uniformly. In doing this we should avoid wounding the velvety tissue of the sole or drawing blood. The proper shoe is the half bar shoe; see the engraving. The pressure should not be taken from the quarter unless it is sore. Trim the feet level, fit your shoe so that the bar covers or presses on half the frog, this will spread out the quarter to where it is wanted. The shoe should also be used in all cases of broken down quarters or quarter cracks. After leveling the foot and fitting the shoe I always lower the heel next to the corn so that the pressure



A HALF-BAR SHOE FOR THE CURE OF CORNS

comes on the frog and not on the heel. Also see that the frog is in the proper state to receive the pressure. It must be soft and elastic. Never put pressure on a hard, horny frog. When the foot is in this condition soak the foot in water and oil it. This will soften it.

Chronic corns are nearly always found where one quarter is contracted and the only way to cure corns successfully is by frog pressure. You never find corns unless the quarter is contracted to a certain extent. Corns are usually the first stages of contraction. In reading Brother C. A. Malmberg's article on proper shoeing for corns, it is a marvel to me to know how his shoe accomplishes all he claims. But for all that I won't say that you have not been successful, but I don't think your shoe would work on many horses which I have shod and cured of corns.

I am pleased to read the many inquiries which show that horse shoeing has come to be a scientific work and requires just as much skill and study as we can give it. Knowledge will not kill any man and it is pleasing to see so many who are eager to learn. Some one spoke of Brother E. W. Perrin in the August number, as being very good. My opinion of the gentleman is that he is very scientific. His ideas all stand like pillars of sound judgment and deep

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thought. If the brother who called Brother Perrin very "good" would only give us something better, we could judge for ourselves as to whether he was an authority to so speak or not. Then I read in a back number of some fellow who must have been born with a gasoline engine in him. The way he nailed shoes on horses and fitted them was something marvellous. Don't let us make the same mistake. Whenever we pick up a foot, let us remember we are working on one corner of one of the noblest animals God has given to man and not on a block of wood. Let your skill do everything in your power for his ease and comfort and your reward will be a good trade and lots of cash.

How many of the readers of THE AMERICAN BLACKSMITH have taken a course in anatomy and can display their certificate? If you, my brother, have not made a study of the physiological movements of the foot and legs and the anatomy of the same do so at once. I would like brother Mitchell, to let us know what results he has by using the half-bar shoe. Let us hear from you and also any others who give this shoe a good fair trial.

A Bad Over-Reacher.

E. W. PERRIN.

The subject of this article is a fine, five-year-old mare, as pretty a buggy horse as I ever saw. The owner says that when he first got her she travelled clear and perfectly, but that about two months ago she began to go short in

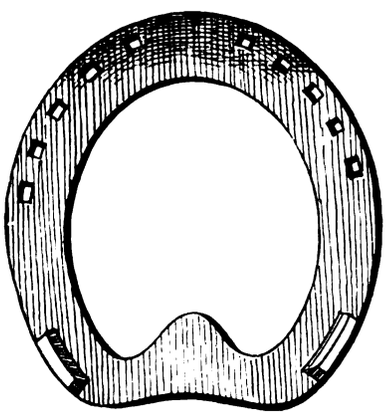


FIG. 1. A BAR SHOE WITH ROLLED TOE FOR THE OVER-REACHER

front, to change and "mix" in her gait. After a while she began to stumble, then to tear the front shoes off with the toes of her hind ones, and lately she began to step on the heels and quarters of the front feet, lacerating them badly. When she came to my shop she was wearing quarter boots and shoes with tapered heels for "grabbing." One of the first things I noticed after removing the boots was that the heels of the front feet were very low, (see Fig. 2) in fact

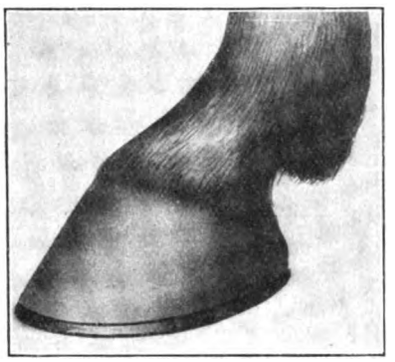


FIG. 2. THE HEEL IS TOO LOW

that she had no heels. The hair of the coronet was touching the heels of the shoe. On picking up the foot I observed that the sole was flat, with an abnormally developed frog; in short it was evident that the mare had been affected with a mild attack of laminitis. At this time no abnormal growth of wall, so characteristic of the laminitic foot, appeared. She had been shod so often that the bulk of the wall had been rasped away. In this condition the owner said that she was utterly useless as a buggy animal, because she could not go at a walk without over-reaching.

In this case laminitic feet was the primary cause, and indifferent, unscientific shoeing the secondary cause. The owner says that she was shod with plain shoes with heels when he bought her, in which shoes she traveled splendidly. This does not alter the fact that she has laminitic feet. Probably she had not long returned from a rest in the pasture, in which case the hoofs being expanded by the cool, moist earth, and free from pain, the locomotion of all four limbs was balanced, and, as the owner says, "She travelled splendidly." But when the mare had done a couple of months fast driving on our hard roads, the hoofs got dry and began to shrink, the low heels began to suffer from the concussion imposed upon them by the high heel calks, the feet got dry and tender, and, the owner says, "She began to stumble and 'mix' in her gait." Presently the feet are so sore that she does not pick them up quick enough to get them out of the way of the hind ones. The front feet are "out of time" with the hind ones, and she begins to strike the front shoes off with the toes of the hind ones. The horse-shoer, finding that he cannot keep a shoe with calks on (she knocks them off as fast as they are put on) shoes her with a plain shoe with tapered heels. These she cannot get off, but lowering the heels puts too much tension on the flexor tendons, which, by causing pain in the legs as well as in the feet, increases the trouble by making her step right up on her quarters.

In this case the front feet must move quicker; must be made to move in unison with the hind feet, or the over-reaching can not be cured. Since you cannot quicken the motion in front unless you relieve the pain in the feet and legs, the prinicpal factor in the cure is to get the soreness out of the feet and the flexor tendons.

A couple of months rest on a nice, soft pasture, (without shoes), would accomplish the desired result; the cool, moist earth would relax the shrunken hoof, while the heels (being relieved of the unnatural weight placed upon them by wearing high heeled shoes would begin to grow up to the proper angle, thereby relieving the flexor tendon of undue tension. But if the animal is again put to the same work unscientifically shod, the same abnormal conditions will return. So we assist the curative forces of nature by artificial means and by removing the cause as far as possible, prevent the recurrence of the trouble. To accomplish this end we remove the shoes and poultice the feet with hot bran mash for a few days

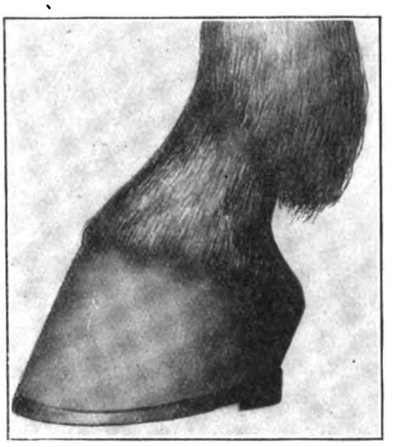


FIG. 3. THE HEEL AS IT SHOULD BE

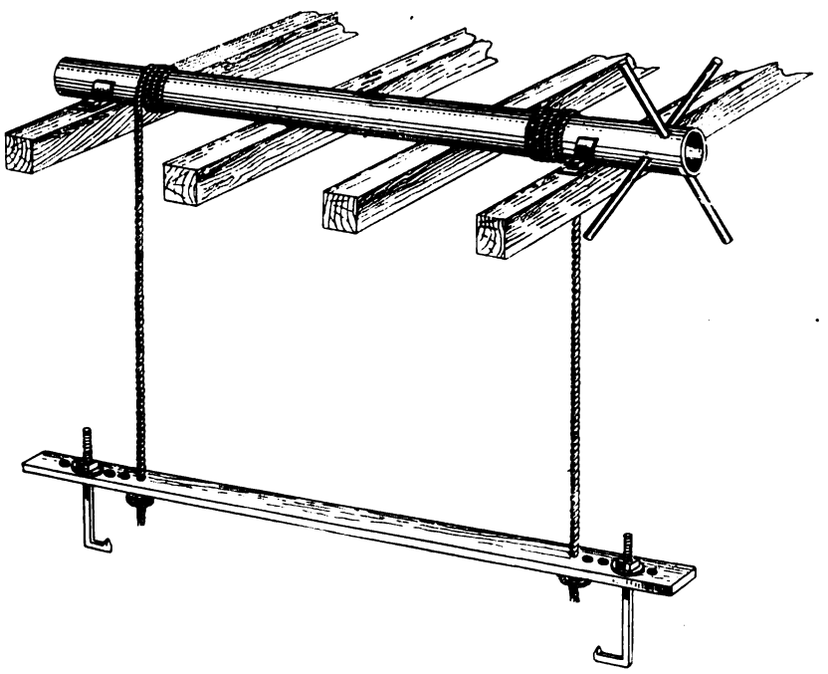
If the animal has been highly fed, a cooling diet of bran mash with a teaspoonful of nitrate of potash in each feed will greatly help to relieve the sore feet. The feet being ready to shoe, use a light but wide-webbed bar shoe

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(Fig. 1), punch holes around the toe and fit the shoe so as to relieve the heels of weight. Now to restore the normal angle of the foot and pastern, we must raise the heels. To do this weld a steel slug on each heel, roll the toe of the shoe at the "breaking-over point" as shown by the wear of the old shoes at the toe and apply the shoe with a leather pad, tar and oakum; nail the toe and leave the heel nails out. Of course this mare can strike a bar shoe off as easily as a plain shoe if she reaches it, but the point is, that being scientifically shod, the sore feet and tendons being relieved, she gets the front feet out of the way of the hind ones; hence the over-reaching is cured.

A Common Disease Affecting the Horse's Feet.

The disease in question is called sand-crack and is a cleft or fissure in the hoof, beginning at the coronet and extending downwards, frequently, the whole length of the wall. This condition must, however, be differentiated from the cracks in the horn which have their beginning at the ground-surface and extend upward, but do not involve the coronary band.



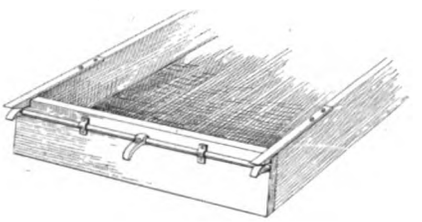
A SIMPLE CONTRIVANCE WHICH SAVES MUCH TIME AND LABOR

The causes of the condition are several. Probably the principal one is the dry condition of the horn. This renders the structure more brittle and liable to crack on violent concussion. Another common cause is an injury to the coronet. With a brittle hoof such injury will cause a sand-crack, while where the horn is naturally elastic it will not crack so readily. The sudden evaporation of water from the horn which takes place when a horse is brought in from a moist pasture to a hot stable with a hard dry floor, renders the horn extremely brittle and very liable to crack.

Sand-crack usually makes its appearance by way of a very slight crack in the hoof. Lameness is present in severe cases which have been produced suddenly or where the crack has slowly advanced and has been in existence for some time. This lameness is caused by the pinching of the sensitive laminae by the crack as it opens and closes as the foot is in action.

The treatment of the case consists in arresting all movement of the edges of the crack. If the crack is well open and any dirt or any other foreign substance has got in, this must be removed before anything else is done and the whole crack washed out with an antiseptic. The edges of the crack must then be brought together and fixed immovably. There are many methods adopted for effecting this but probably the one most easily applied by the smith is to attach a brass plate on the hoof directly over the crack, attaching it with small screws. The edges of the crack must, of course, be forced as near together as possible before attaching the plate. A blister is also usually applied on the edges of the cracks before putting on the plate.

Special attention is required in shoeing a foot affected with sand-crack. The shoe should be light and in case of toe crack should have two clips, one on either side of the crack, and at a slight distance from it. The horn directly under the crack should be cut out in a semi-circular fashion so as to remove all weight bearing at this point and the entire foot must have a good solid bearing on the shoe. It is essential that the effected hoof be kept moist and elastic and any good hoof ointment which has this end in view is recommended. As the horn tubes of the foot are open on the under surface of the hoof, it will be found possible to apply the hoof ointment on a piece of waste or oakum and to keep this in place on the hoof by means of a leather pad or any other method with which most smiths are more or less acquainted.



THE WAGON USER WILL APPRECIATE THIS DEVICE

A Simple Device for Raising Wagon Boxes.

W. M. BAKER.

The accompanying engraving shows a simple device which may be rigged up by most any smith having need of an apparatus of this kind. The work of lifting a wagon box becomes mere child's play with a windlass arrangement of this kind. As seen in the engraving, A is a piece of 4-inch pipe long enough to pass over four of the crossbeams overhead. Our shop in which the wagon work is done has no upper story and we therefore placed the pipe directly on the beams which support the walls and run across just overhead. After securing the pipe and cutting to right length, drill four holes in one end of it. These holes should be drilled in such manner as to have each set of two directly opposite each other, so that when two pieces of gas pipe are inserted in the end they will pass each other as in the engraving. Before placing on the beams, two holes are drilled in the pipe to receive the

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rope ends. This will prevent the ropes from slipping around the pipe. The pipe is now placed upon the beams and either brackets placed each side of it or long spikes driven into the beams to keep the pipe from rolling. Two good stout ropes of equal length are now secured and after binding the ends with wire, drive and fasten in the holes made for this purpose. Now secure a good stout plank of 2-inch timber about six inches wide and long enough to go across your widest wagon box. In each end of this bore four holes. Now forge two hooks and thread the ends of both of them to receive a large nut. The loose rope ends are now thrust through the two holes nearest the center of the plank and your device is ready for use. The holes in the ends of the plank are for adjusting the hooks to different sizes of wagon boxes. A stop to keep the device from turning after the box has been raised is simply an iron rod which fits loosely into a hole drilled through one of the beams.

A Device for Unlocking the Hinged Tail Gate.

T. E. THORN.

In manufacturing the occasional wagon ordered of us we find that a little device here and there about the vehicle helps very materially to satisfy the customer and bring him to our shop when again in need of any new work. A device, perhaps by no means new to some smiths may prove of value and interest to some of the craft. It is a device for opening the tail gate of a wagon box. The tail gate is usually held in place by two spring catches, one on each side of the wagon. To open the gate by hand, without any mechanical help is rather bothersome, so we make a device as shown in the accompanying engraving. This consists of a piece of ½-inch round stock. On each end is forged a projection which is curved similar to the catches on the springs. In the center of this rod is a curved handle. The rod is now fastened by means of four eye-staples.

Treating High Speed Steel.

BY STEEL WORKER.

After the machinist has accomplished his part of the work (machining) it is then necessary to have the work hardened, which can be done in numerous ways according to the requirements of the tool. For planer, shaper and slotter tools, it will be found a good way to fuse the cutting edge in a quick fire, after which dip it quickly in oil until cold. After regrinding, it will be found ready for use, will give good account of itself, and incidently reflect credit on the smith who forged it. The oil used depends upon how hard you desire the tool. We will suppose that it is required as hard as it is possible to make it for machine shop use. In that case, after fusing the point or cutting edge, dip it quickly into thin lard oil, or for extreme hardness, dip it quickly into kerosene oil. The limit of hardness in this steel will then be obtained. In using the oil, especially the kerosene, great care must be observed or the oil may flame and burn the operator.

We have practiced the described methods in the treatment of the high speed steels with marked success, and have had steels stand an efficiency test of 138 feet per minute for 18 minutes on hard cast iron, with the feed of the machine $\frac{1}{16}$-inch, and depth of cut $\frac{3}{16}$-inch and the tool was in good condition when test was completed. We have also made tests on unannealed high carbon steel, and found the cutting quality of the tools quite as satisfactory.



AROUND OUR FORGE FIRE.

"How's the new volume starting off," roared Benton, bursting into the Editor's room.

"With a rush," smilingly replied the Editor pointing to the proof sheets for October.

Benton grabbed the sheets, dropped into the easiest chair and ran through the pages as though his life depended on it: "Heavy paper cover, timely talks, frontispiece"—and Benton named the various new features and departments. Then in a disappointed tone he said, "Going to turn it into a railroad paper?"

"No," replied the Editor somewhat firmly. "The railroad smiths get special attention this month because of their recent convention. Every branch of the craft will be treated the same. Next month it will be the horseshoer, in December another branch will have first place and so on through the year. But each month will find every department and branch of the craft represented."

"That's a pretty good scheme," said the other. "You've got a corkin' good paper here."

"We certainly have," put in the Editor proudly, "and each month will find it better and more interesting and valuable. Take the November paper for instance, the illustrations will be especially fine and the articles for the horseshoer are remarkable in many ways. They promise to create quite a stir in this field."

"What's this about a home-made cupola? You don't mean to say that a man can make a serviceable cupola in his own shop?" demanded Benton.

"Why certainly he can. Iron has been melted in a barrel lined with clay. It's not necessary to have an expensive and elaborate contrivance for the purpose, By the way, we're going to start a series of articles on this same subject in a month or two and they will be so full of interest that even you will read them."

"But what does the blacksmith care about foundry work and smelting?" returned the other.

"What does he care?" repeated the Editor, flourishing a bundle of letters; "All these are requests for such articles, and you're well enough acquainted with the paper to know that we give our readers exactly what they want." Then thinking of Benton's hobby, he asked, "Any new receipts, Benton?"

"Yes, one for removing old paint," replied the other taking out his receipt book. Then in his accustomed singsong resulting from long practice, he read, "Potash, one pound, dissolved in water, one quart and a pint and heated: sufficient dry ochre to make compound consistency of rough stuff: spread on paint and remove with scraper when the paint is soft. Hooker said this is about as good as any paint remover he has ever used. Here's a little kink on trueing up oil stones. A stranger told me about it at the shop. He said to sprinkle coarse emery on a smooth metal surface and to rub the stone over this. It works quickly too. Said he hadn't used any other method for years."

"What do you do with your broken hack saw blades?" returned the Editor suddenly.

"We throw them in the scrap," was the reply. "Why?"

"Well it just occurred to me that with a simple handle or holder these pieces would make fine scrapers for the woodworkers and the painters. For instance, take a four-inch piece of round hardwood, saw a slot the length of one side and drive in a piece of saw blade. The edge could be sharpened repeatedly."

"I'll just put the boys onto that and save our broken blades for them" and Benton seeing the Editor pick up his blue pencil made for the door.

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For the Love of a Horse.

J. W. FOLEY.

You've got the drop, Sandy! There's cottonwoods handy; I ain't no Spring chicken—I know what it means!
So get out your halter; you won't see me falter! I ain't no cheap tenderfoot still in his teens!
You've raced me and chased me, but you ain't disgraced me! Old Baldy went lame from a prairie dog hole—
You're crippled, old fellow, but there ain't no yellow in all of your make-up, from cropper to poll!

Don't hesitate, Sandy! I know it's onhandy to hang an old friend just for stealin' a horse;
But get your traps ready for I ain't onsteady; an' justice is justice an' must take its course!
I gave all your posse a run that was flossy, through sage brush an' cactus, up cut bank an' hill.
An' now that you've caught me an' got me, why rot me! I'm just a plain outlaw, who bows to your will.

Want Baldy? Well, hold him! An' Sandy, I sold him—I got in a jackpot an' needed the dough;
I sold him to Meehan, th' same time agreein' that he'd sell him back when I wanted it so;
An' Meehan, th' greaser, he went back on me, Sir, an' wouldn't make good when I flashed him a roll,
An' said I had sold him for keeps an' I told him some things not intended to comfort his soul.

Sell Baldy? Why, Sandy, he's carried me handy a hundred long miles in a many day's sun;
An' come in a prancing, his head up an' dancin', just like a young tenderfoot sportin' a gun;
He ain't no cheap quitter! He'll cut out a critter an' hold him hard fast when he's roped an' been thrown;
An' five years I knowed him an' five years I rode him an' never a leg crossed his back but my own.

I got set for roamin'—there's work in Wyomin'—an' when that durn greaser went back on his word
I went an' called Baldy an' when he was called he just pricked up his ears an' came out of th' herd;
An' say! When he'd whinner, as I am a sinner, I put both my arms 'round his neck an' I cried.
An' then I just hollered an' Baldy, he followed—an' you know th' rest an' th' end of th' ride!

So that's th' tale, Sandy; there's cottonwoods handy! An' I ain't afraid of th' law of th' plains,
But you can damn me, Sir, if that thievin' greaser will ever get Baldy—I'll blow out his brains.
What's that? Nothin' doin'? No tree party brewin'? Well, Sandy, that's handsome! "Just go on my course?"
What's this that's a-fillin' my eyes? Tom McQuillen a-weepin'! An' all for th' love of a horse!



The next international exposition is to be held in Dublin in 1907.

The busy man can always do more. 'Tis the fussy chap who is even too busy to do business.

Warm the box slightly before pouring your babbit. 'Twill dry it out and insure easier pouring.

How often the fire occurs just after the policy has lapsed! Don't take any chances with your insurance.

Don't flood its bearings with oil, nor allow them to run dry. The drill deserves better treatment at your hands.

Most prosperous to the farmer has been the past season. Present your bill now and your'e likely to get your money.

"I'll never be disturbed here" said the spider at Tom's, as he spun his web between the broom and the shop wall.

If the boy has any head at all, let him figure things for himself. It will give him self-confidence and this is necessary to a good smith.

Another new volume has started. Bigger, better and more valuable than ever is the paper. Let us know what you think of the changes.

A giant in marine gasoline engine construction is one of 1,600 horsepower about to be sent to Russia. 'Tis said to be the largest engine of its kind.

The apprentice problem is becoming more serious each day. Induce the young man to take up the good old trade. The demand for young blood is growing constantly.

'Tis the man with the goods who makes the first sale. Anticipate the demand for certain articles by putting in a small supply. People want goods when they want them.

The honor of shoeing one of King Edward's horses goes to John McGrath, of Ontario, Canada. The horses were sent to the Canadian Fair at Toronto by the King.

It's not a success as a covering, nor as a filling. It must permeate the job through and through. Then is satisfaction a trade winner. Serve your customers liberally with it.

Of course he closed up shop. Hadn't sent out a bill or statement for over a year. Work alone doesn't keep you going. It's getting the money after doing the work that counts.

What are said to be the heaviest rails in the world are those used on the Philadelphia Belt Line. They weigh 142 pounds to the yard and are 17 pounds heavier than any before used.

A South African railway is considering the question of establishing a steel plant for dealing with scrap. The officials of the road can find no local use or market for the scrap and owns a large quantity of it.

The village store and the village smithy have one business in common—that of entertaining the professsional village loafers. If the store keeper wants to stay in the business, why not give him your your part of this trade?

In a way, every smith is responsible for what his apprentices make of themselves. He should do all he can to make men of them. He should make it his business to interfere when he finds them on the wrong track either in or outside the shop.

The automobiles registered in the United States are estimated at over 80,000. New York State alone has 28,250, which, 'tis said, aggregate 30 million dollars. It is assumed that the entire country spends about 70 million dollars annually for motoring.

Don't expect miracles from an advertisement. You wouldn't expect a tree to result if you planted a seed for one day—then why expect your business place to be overwhelmed with orders after placing one ad. Keep your advertising seed in the ground, water it, let the sunshine get at it, keep the weeds out and something will grow. You must give advertising a fair chance.

Drilling for water in Cape Colony, South Africa, for stock breeding and purposes of irrigation was first undertaken by the government for the farmers at a minimum cost. The government owned the drilling machinery and trained men for operating it. Now the government encourages well drilling by giving subsidies equal to not more than one-half the cost of drilling the wells, and the work is undertaken by contractors who have their own drilling machinery and employ most of the men previously trained by the government for operating the machines. The equipment used for drilling is mostly the jumper drill type. Several of these are of American manufacture.

A Cape Town concern is now manufacturing a drilling machine which is proving a dangerous competitor. The total cost is $2,263, including boiler and engine, or $1,533 without power plant. It is constructed entirely of metal, thereby resisting the weather. The average depth to which it is usually necessary to drill is about 300 feet, at an average cost of $3.89 per foot. The statement is made that the new Cape Town machine has drilled as much as 126 feet in sixty-four hours, all rock drilling. It is designed to drill a 6-inch hole to a depth of 500 feet with a steam-power drill.

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American Association of Blacksmiths and Horseshoers.

While the heading at the top of this column is new, the sentiment expressed is not a stranger to this organization. *"We stand shoulder to shoulder."* What a craft it would be if all the smiths kept this thought in mind. What an easy matter to make it the motto of every smith in the country if each one would but take it upon himself to make it so. The busy season in smithing circles is just before us. Why not get together now in your locality? A settlement of the price problem is but one of the many advantages presented by a good strong county association. A few cents advance in prices now will mean dollars added to your bank account at the end of the rush season. But this cannot be done without some effort. I want you Mr. Reader to start the ball rolling in your county. I will help you and give you every assistance within my power. Other counties have been organized; other counties have raised their prices; other counties enjoy harmony. Why not yourself? I want you to address a postal card as follows: The American Association of Blacksmiths & Horseshoers, P. O. Box 974, Buffalo, N. Y., and on the other side state a request for my assistance in organizing a county association. If you do not think the smiths in your county need an organization tell me so. I should be very glad to know of any such conditions. Perhaps you can give me some pointers for brother smiths which will prove both valuable and interesting. But write me today. Don't lay the paper aside before you do. It may mean much more than you now realize.

THE SECRETARY.

The N. R. M. B. A. Convention.

The fourteenth annual convention of the International Railway Master Blacksmiths' Association was held at the Sherman House, Chicago, Ill., Aug. 21st, 22nd and 23rd. The opening session was called to order by President D. B. Swinton at 10 o'clock on the morning of the 21st. Mr. H. S. Taylor, Assistant Prosecuting Attorney acted in the absence of Mayor Dunn to welcome the association to the city. His hearty greeting was responded to by Mr. W. W. McLellan in a few well chosen words.

The officers elected for the next year are as follows:

President; J. S. Sullivan, Columbus, O.

1st Vice President; G. H. Judy, Glenwood, Pa.

2nd Vice President; J. W. Russell, Renova, Pa.

Secretary and Treasurer; A. L. Woodworth, Lima, Ohio.

Chemist; G. H. Williams, Boston, Mass.

The meeting place for the next convention is Montreal.

The several subjects for consideration and discussion were thoroughly covered and a few of these are published on another page of this issue.

A Brisk Fall Season.

The fall season has always been looked forward to as a rush time in the smith shop. This year promises to be a better business season than ever—crops and the general prosperity of our geat country as a whole, indicate a brisk fall business season. Every business interest hinges on the success of the crops and we have every assurance that the fall season will be most prosperous.

Our crop record for this year is a marvelous one; corn being figured at over two and one-half billions of bushels, wheat at over one-half billion, while cotton will pass the ten-million mark. And 'tis said that the profits of the steel corporation for the past three months will figure very close to forty millions.

With this shining indication for increased business, the season should be one of unequaled activity in all branches of trade and especially in smithing circles. The volume of trade to be gleaned by the individual shop depends, of course, on the individual smith. Thorough preparation for the promised brisk season is demanded. A good shop well-equipped with good tools and machines, with the faculty of caring for customers' wants immediately, will win a good big share of this business.

Can You Afford It?

The manufacturer selling on a narrow margin depends upon quantity duplication and lightning production for his profit. He installs such machines as will place his products upon the market in the shortest possible time. The time and labor-saving tools are depended upon for the profit. So with the smith—time shortened means increased profit. And up-to-date machines and tools are required to insure this end.

If you have work enough for a power hammer, gas engine, or other labor saving machine, can you afford not to install it? The extra cost will be returned in extra profit and the delayed installation of labor-saving devices when you need them, simply means a delay in the increase of profits.

That the gas engine is a source of increased profit to the smith has been proven time and again in these columns. Even the smith with a small trade has found it a builder of business and profit. How much more marked will be its effect on the trade of the smith with a business of larger proportions can be easily imagined. And why not a similar stimulation of business and trade by other labor-saving, time-diminishing, machines? The trend of the age is toward rapid production and while quality is sometimes lost to view, the blacksmith will do well to keep this goal always in sight. In short, if you have need of a machine install it without delay, but in your search for rapid production keep quality in mind.

Nothing but the Best.

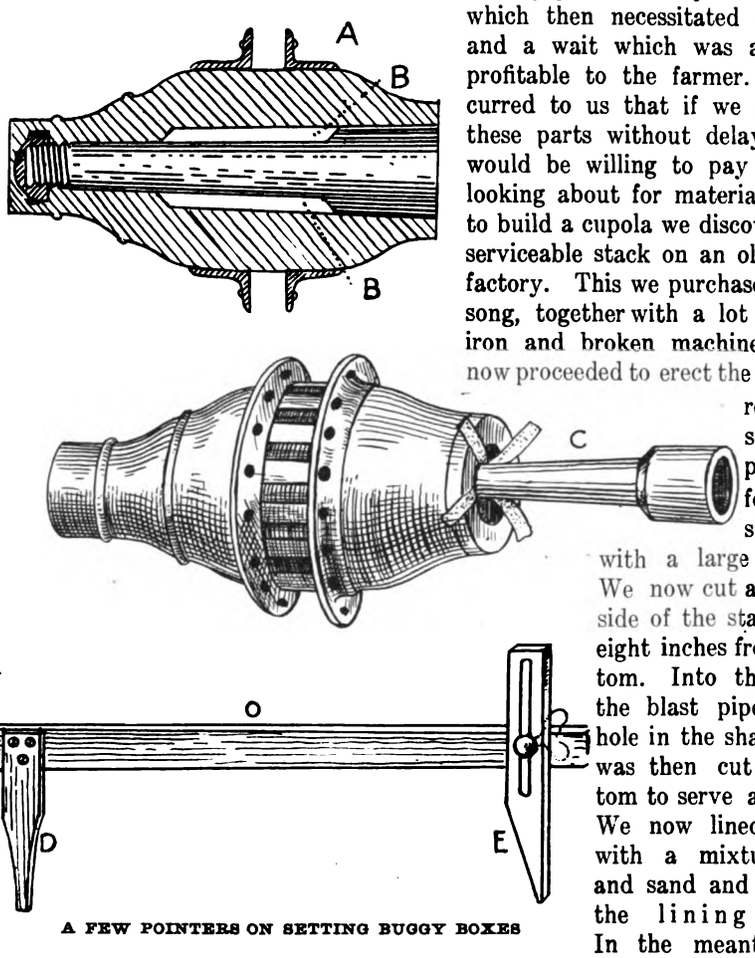
There is little that effects a man's business methods as does the "good enough" microbe. The readiness to say "It's good enough" loses a customer, an order, or even money and property. A letter carelessly written, a job carelessly done, a contract carelessly drawn up are dismissed with, "It's good enough—we can do better next time." But the next time is now—the present letter, job and contract. The present thing is the one to do to the best of your ability. Then there will be a possibility of a "next time."

No business of any importance and standing was ever built on the foundation of carelessness. Carefulness of

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detail is the secret of many a success and attention to small things is likely to result in best effort in all things. Nothing is "good enough" except the very best that can be done and this should be our aim in even the very smallest of things.

If a letter to Jones can be improved—improve it. If the job for Brown is not as good as it should be—make it so. If that contract with Smith doesn't quite satisfy you or is not quite right—correct it before signing. A mistake prevented



A FEW POINTERS ON SETTING BUGGY BOXES

may save you much time, trouble and expense in correcting one. It may take time, but it is time well spent, and if it results in establishing the habit of exactness, you may well have spent again as much time. Get a reputation for exactness, for attention to detail, for doing your best always and no amount of competition or price-cutting is likely to injure your trade. It is a business foundation of which you may well be proud.

A Home-Made Cupola.

E. D. F.

The article in the September issue on a simple brass-furnace reminds me of a home-made cupola which we operated some years ago. The story is a good one and I think will interest readers of "Our Journal."

I was located in a farming district of the west. My partner and I had a fairly well equipped shop and we were getting all the work we could possibly do. In supplying the needs of the farmers in the section, we found that a cupola or melting furnace would not only be another source of profit but would enable us to supply implement and machinery parts on very short notice and which then necessitated a shut-down and a wait which was anything but profitable to the farmer. It also occurred to us that if we could supply these parts without delay the farmer would be willing to pay us well. In looking about for material with which to build a cupola we discovered a fairly serviceable stack on an old abandoned factory. This we purchased for a mere song, together with a lot of old scrap iron and broken machine parts. We now proceeded to erect the stack in the rear of our shop. It was placed on a foundation of stones topped with a large iron plate. We now cut a hole in each side of the stack and about eight inches from the bottom. Into these we fitted the blast pipes. Another hole in the shape of a door was then cut at the bottom to serve as a tap hole. We now lined the stack with a mixture of clay and sand and then baked the lining thoroughly. In the meantime a platform or charging stage was built around the top of the cupola. This was reached by means of an incline, up which we could wheel a barrow when ready to charge the furnace. We now connected the blast pipes with an extra large bellows and everything was in readiness for melting the scrap and pouring the castings.

My partner and I had gathered some knowledge of foundry practice in the east and this was of much value to us in our experiments with the home-made cupola and the crude moulding outfit which we constructed. We operated this crude but profitable affair for several years, or until the regular factory parts were sold by an implement agent. This, of course, put our foundry department out of business. The metal used for charging the furnace was old implement and machine parts and was procured from the neighboring farmers and from the old factory.

A Few Pointers on Setting Buggy Boxes.

C. W. METCALF.

I will give method for setting boxes especially on new work. I bore the hub the size of the box for about two-thirds of the way through. The remainder is bored to fit the point. Now drive the box in good and tight and it will never come loose. Look at illustration A, you will find an open space at B. The bearing must be at each end in order to make good. If it is in the centre, the box will work loose in a short time on account of the side jerks that it receives. By having the bearing at each end there is absolutely no chance for any side vibration at all and the result is a perfect fit and no more bother. For setting old ones that are not cut too badly the method shown in the illustration at C is very good. Take a piece of firm cloth and tear it into strips ¾ of an inch wide and lay them across the hub. Then place the point of the box on it and press it down with your hand. If you think you haven't enough, pull the box out and add more cloth. Use an old spindle with which to drive the box so as to be sure not to break it. If the hub is cut too badly for this method put the box in place and wedge the point of it just enough to hold it. Then make a gauge as illustrated at O and place the spindle D in the box and spindle at E on the rim. Now trace the rim around and true the box. Now remove the gauge. Then take a ladle and fill it with sulphur and set over a slow fire until it melts. Pour the contents in around the box until full and you will have your box set now and forever. I don't ask you to take my word for this but try it, you will find it is the best method. You remember that we used to have matches made of brimstone and they tell me that brimstone is used in another place but nevertheless it is good for something else—for setting buggy boxes.

Don't dismiss these pointers with a wave of the hand if you have never tried them. The only way we can hope to lighten our labors and improve our work is to try out the kinks of which we have never heard before. And every smith

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should take it upon himself to give to his brother craftsman any and all the information and enlightenment he can. How often we find just what we want in another smith's writings! Let each one of us, therefore, help as often as possible in spreading good, practical craft knowledge through these columns.

Two Simple Kinks for the Vehicle Worker.

GEO. NABLO.

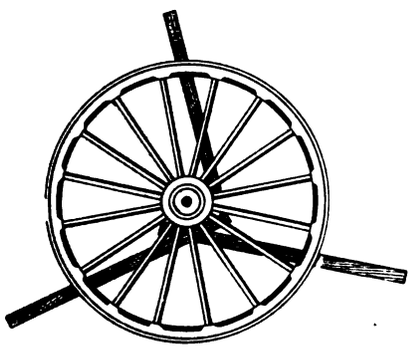
No doubt many smiths, when required to repair the reach, kingbolt or fifth wheel on a buggy, crawl under the rig and then on knees or back endeavor to unscrew the broken parts and then in like manner replace them. The writer did this for many years, but now saves both his knees and his back, by tipping the buggy to one side. This can be easily done with the aid of the helper. The rig is then supported in this position with poles and the repairing done with comfort and ease.

When a wheel is brought in to have the tire reset, I find that three sticks of timber save me much time and trouble. I use them as shown in the accompanying engraving to support the wheel. Arranged in this manner they raise the wheel sufficiently from the floor and at the same time hold it firmly.

A Polishing Wheel of Felt.

A. E. PHILLIPS.

In looking about for material from which to make the polishing wheel we discovered two pairs of old felt boots such as farmers wear with heavy over-



A SIMPLE KINK, YET TIME AND TROUBLE SAVING

shoes in winter. From each boot we cut the foot and then slit the leg part down the back. We then placed the pieces under a weight to straighten them. We now cut two circular pieces about 6 inches in diameter, from each large piece, thus giving us an 8-ply wheel. To hold the disks of felt we used two iron plates of ⅛-inch stock and considerably smaller than the felt pieces. One of these plates was placed each side of the pieces of felt and thus placed on one end of the shaft of the emery stand, nuts being screwed tightly against each iron plate so as to hold the felt disks firmly. A wood worker's chisel was now held against the edge of the wheel and an even surface put on the wheel. This makes an excellent polishing wheel. It is easily made and the expense is very slight even should you be compelled to purchase four of these old boots. The wheel should travel at a good speed.

A Short Story of Thomas Blanchard, Inventor.

DWIGHT GODDARD.

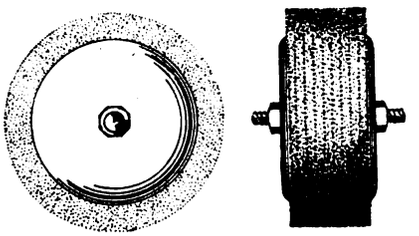
From Booklet by Wyman & Gorman.

Thomas Blanchard started out in life under very discouraging circumstances. His father was a New England farmer, of Huguenot descent, who added to his income by doing blacksmith work for his farmer neighbors.

Thomas was born in 1788, at Sutton, Mass., the fifth of six sons. As a boy he was far from promising, stuttering badly, and counted by some to be half foolish. He took little interest in farming or study, and spent his time whittling shingles, making windmills and miniature water wheels. As he grew older he became interested in iron work, and as his father refused him the use of his forge, he saved up all the charcoal he could gather and hid it behind a wall. Then he built a rude forge and used an old wedge driven into a log for an anvil, waited until his parents were absent and tried his hand at working iron.

At thirteen he heard of an apple-paring machine, and after patient experimenting and repeated trials succeeded in making a machine that would pare more apples than could a dozen girls at the winter "bees."

This success deepened his inventive interest and made him of less use on the farm, so when eighteen, his father sent him to work for an elder brother who made tacks at the neighboring town of West Millbury. Here he was put at the monotonous task of heading the tacks by hand. The points were first cut from strips, and then had to be picked up by the thumb and finger, gripped in a vise, and headed by a blow. He was given a certain number to be made each day. One of the first things he made here was a counting machine that would ring a bell when the required number was complete. His brother forbade him spending any time in these idle projects, but his inventive genius could not be suppressed. He began to consider a machine to cut and head the tacks at one operation. The idea came to him long before he had the skill or



QUICKLY MADE AND AT SLIGHT COST

means to construct. For six long years he worked at the idea, expending everything he could earn to buy materials, throwing away the old as new improvements suggested themselves, carrying the models about with him from place to place, persisting in spite of every discouragement. He became so poor that his own brother refused to trust him for groceries, even when his family was actually suffering and in want.

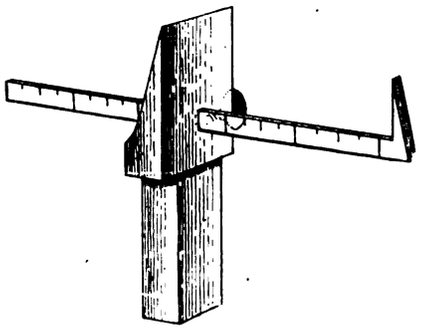
At last it was a success; it made much better tacks than could be made by hand, at the rate of five hundred a minute. It was sold for $5000, which placed Blanchard in comfortable circumstances. The tacks were all sold, for some years at least, to one house, who kept the source of supply secret and realized handsomely on the sales.

At this time the attempt was being made by the Government to manufacure its muskets in this country; one of the shops making the attempt was located at Millbury. The barrels had been made by hand, but the process had been so far improved that the straight part of the barrel was then being turned in a lathe. There was an irregular enlargement at the butt where it was joined to the stock that still had to be finished by hand at considerable expense. Blanchard's inventive powers becoming recognized, he was sent for and asked if he could get up a machine that would do this. He said he would try, and it was not long before he suggested the addition of a certain cam motion to the lathe that would permit turning the cylindrical part and the flat and oval end at one and the same operation.

The knowledge of this coming to the attention of the Government, he was

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sent for to introduce it at the Springfield Armory. While the workmen were gathered around to witness its operations, one said to another, "Well, John, he has spoiled your job." Still another exclaimed that "he could not spoil his, for he could not turn a gun stock." Blanchard overhearing the remark answered, "I am not so sure of that, but I will think of it a while." On his way home soon after, the whole principle for turning irregular forms came to him In a short time Blanchard had built a wooden model of his idea, and, sure enough, it turned a miniature gun stock with perfect accuracy.



A TIME SAVER WHEN CUTTING SHORT STOCK.

The principle is this: A pattern and block to be turned are fitted on a common shaft, that is so hung in a frame that is adapted to vibrate toward or away from a second shaft that carries a guide wheel opposite and pressing against the pattern, and a revolving cutter wheel of the same diameter opposite the block to be turned. During the revolution of the pattern the block is brought near to, or away from, the cutting wheel, reproducing exactly the form of the pattern.

The beauty of the invention is that by varying the relative sizes of the guide wheel and cutting wheel, any variation in size relative to the model can be secured, and by reversing the transverse motion of the cutting wheel, a perfect right and left can be made from the same pattern. Then by varying the transverse speed of the cutting wheel in relation to the guide wheel, the object is made either longer or shorter than the model.

(To be continued.)

A Hardie with Measuring Gauge.

NORMAN MATHESON.

Prize Contest.

The accompanying engraving shows an improved hardie or cutter. To make it, take an ordinary hardie or cutter and punch a hole through it as shown in the engraving. This hole is then fitted with a rod or gauge having dimension marks upon it. At ore end of this rod or gauge is welded a cross-piece or foot. A small hole is now drilled and tapped at right angles with the first hole and from the outside of the hardie. This is to receive a thumb screw for tightening the gauge when the desired length has been marked. This little tool is very handy when cutting a number of pieces the same length. It saves much time and prevents errors.

Thornton's Letters.—1.

Being "straight-from-the-shoulder" Talk from a Prosperous Selfmade Smith, to his Former Apprentice now in Business.

Dear Jim:

I got your letter—glad to know you're located, but am mighty sorry to find you in a low-priced neighborhood. Better to look 'round a bit and pitch your tent where farmers are willing to pay a living price and where the smith's are not "dyin' to get at each other." But you take this tip, Jim—play "solitaire"—pound iron and talk about your own business. Let the others do as they please. Keep a stiff upper-lip—have confidence in yourself and your ability, but don't go around trying on larger hats. Go at things with determination. You've got it in you, Jim. It's up to you. Make good. Nothing of real consequence is accomplished without good, hard, back-bending effort—you must get right into the harness.

Don't let the people up there think for one second that you haven't anything to do—they're not very liable to disturb your quiet smoke or nap with work if you do. Get busy, and keep busy, and if you make enough noise at it, they'll make you stay busy. And by noise I mean advertising. Of course you have figured on a good big stock of it.

I just touch on these points in a general way, because no special cases have yet come up. I want you to measure right up to the mark, Jim—to make good—to show up good coal and no sulphur in the test.

You won't do very much at the start and some days will perhaps not see one customer. But don't wait for things to come your way—go out and meet them. Keep busy every minute—you can stand it if you forget business when you lock your shop and that's what you want to do. The work a man does during working hours never hurts him—it's the worrying after his business door is locked that kills him. But to get back to the subject—give everybody the impression that you have lots of work. Talk with your neighbors and townspeople whenever you meet them, but use tact—don't speak to them nor at them. Put yourself on the same level with them. Not that you're of a higher level but you're liable to think that you are.

In closing let me warn you about talking about your competitors. Don't do it. Talk about the things you can do and make, but don't advertise the other fellow. Make this a matter of utmost importance—attend to it as you do to a special case of shoeing.

Yours,

THORNTON.

Calculating Engine and Pulley Speeds.

R. P. M.

The past few years has seen many changes in the equipment of the smith shop. Many back-breaking ways have given place to labor-saving machine methods of this progressive age. The smith now starts his engine and is ready for any piece of work from the grinding of a knife to the forging of an anchor. And when installing an up-to-date equipment the smith must needs know something about engine and pulley speed calculations.

The speed usually found best for the line shaft is about 250 revolutions per minute. This speed may be decreased or increased to suit the equipment in the individual shop, a quantity of high-speed machinery necessitating a higher speed and vice versa. A higher speed however increases the noise and requires careful watching of the bearings, while a low speed requires the use of large drivers.

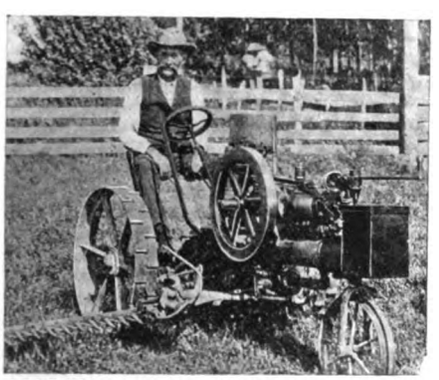
To find the size of the pulley which is necessary on the line shaft, multiply the number of revolutions of the pulley on the engine by its diameter and divide the product by the number of revolutions desired for the pulley on the line shaft. For example; We have a 12-inch engine pulley with a speed of 350 revolutions per minute, multiplying we get 4,200. This divided by 250, the number of revolutions required for the shaft pulley, gives us a result of 17½, the diameter in inches of the line-shaft pulley. The following rule is now used in finding the size of the other pulleys

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on the line shaft; we know the sizes of the pulleys on the machines, their required speed, and also the speed of the line shaft so that by multiplying the number of revolutions of the pulley on the machine by its diameter and dividing the product by the number of revolutions made by the line shaft we get the required diameter in inches of the line-shaft pulley.

The length of the belting is now required. This is found by adding the diameter of the two pulleys over which the belt is to run and multiplying the sum by 3.14159. Now divide this result by two and add it to twice the distance from center to center of pulleys. For example; we have two pulleys, one 16 inches and one 12 inches in diameter travelling 20 feet apart from center to center; 16+12x3.14159 = 8.796 inches. 87.96 ÷ 2 = 43.96, 43.96 ÷ 12 = 3.67 feet. 2x20 feet=40 feet. 40 feet + 3.67 feet=43.67 feet, the length of belting required for the pulleys. The width of the required belting may also be found by rule but this is not considered of sufficient importance in the every-day blacksmith shop.

The speed at which the various machines should operate is important. Emery wheels, grind stones and polishing wheels differ and a few hints may not be out of place. An emery wheel is usually operated at a peripheral speed of 5000 feet per minute and to get the number of r. p. m. at which it must be operated we multiply the diameter of the wheel by 3½. 3½x14 = 44 inches. We now multiply the diameter by 5000. 5000x14 or 70,000. This result is now divided by 44 or 1364 the r. p. m. required by the emery wheel. Grindstones are usually run at a peripheral speed of about 900 feet per minute, while polishing wheels are run at about 7,000 or 8,000 feet per minute.



THE HORSELESS MOWING MACHINE WILL ALSO COME TO THE SMITH

While these are generally considered correct, they may be varied slightly to suit the conditions and equipment in the individual shop. The smith must of course, consider all the details that are likely to effect this branch of his power equipment.

An Up-to-date Automobile Garage.

DAYTON O. SHAW.

Prize Contest.

The accompanying illustration shows a modern and up-to-date garage. At the further end of the building is shown the drive-way which leads up into the second story where there is a large storage room for automobiles. The small door near the corner is the entrance to the machine shop. The machinery consists of an engine lathe, speed lathe, upright drill, shaper, emery wheel, grindstone, and a small forge for dressing tools, tempering, brazing and the like. One thing in particular which I noticed was that all this machinery is new. This is an excellent thing, for no man can do a good job on an old worn out lathe. There are threads to be cut, running fits and driving fits to be made and the machine must run true. The motive power is electricity and all Mr. Beaman has to do is to push the button and things begin to move. The shop is brilliantly lighted on each floor and along the drive-way.

Let us now enter through the first wide door-way the room where automobiles are run in for repairs. Near the entrance there are holes in the floor to let the water run off, while the cars are being washed down. After the car is cleaned it is pushed ahead a little farther until it is directly over a platform which can be lowered so that a man can work underneath the machinery. This is better than lying down on your back in the dirt. The car may now be trundled from here into the machine room where it will be handy to work upon. In the space between the large doors there is a pit in the ground containing a tank which holds five barrels of gasoline. We next enter the second large door-way where the car is placed after being repaired. Last but not least we visit the waiting room. This opens from the larger room through a side door, here we find chairs, a table, ice cold lemonade, the daily papers and a chart showing the route to the lakes, mountains, and sea-shore, a nice cool place to refresh after a ride in the hot sun. Does the waiting room pay? Well, listen to the compliments the manager gets and watch the grin on the porter boy's face as he pockets his tip. Probably you as well as I can remember when some lady has come to the shop to get her horse shod and been obliged either to sit in the carriage under an umbrella or take a walk up the street. She would usually call around two or three times in vain to see if the horse was ready and by the time the job was ready she would be fairly tired out. Now with these modern improvements she can rest in the waiting room without being exposed to the weather or being annoyed by the things that are common around such places.



FOR THE REPAIR OF THE HORSELESS VEHICLE

Mr. Beaman is to make some additions to his garage and when completed he will probably have a blacksmith shop with a power hammer and do some manufacturing. In this way he expects to keep his men employed during the winter. Mr. Beaman believes in advertising and the sign boards at the street corners for miles around say all roads lead to Beaman's Garage.

Dont's for the Craft.—5.

For the Blacksmith.

T. FORD.

Don't say "It can't be done."

Don't try to weld in a dirty fire.

Don't ignore the quality of your coal.

Don't use light blows in forging heavy stock.

Don't have your anvil too close to the forge.

Don't try to use iron that has been burned.

Don't waste nor be too saving with your coal.

Don't use tongs that fit the work imperfectly.

Don't do your work as your father did his work.

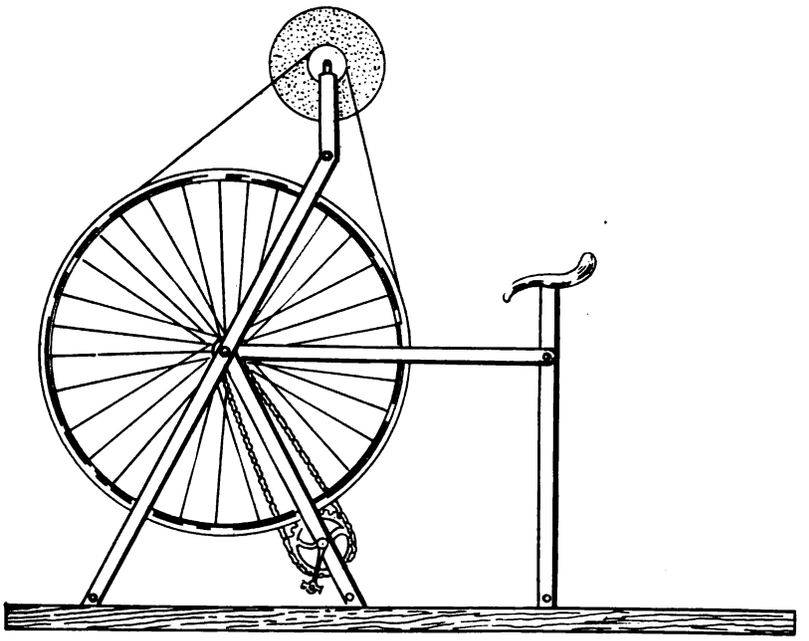
Don't forget that a good fire is necessary for good work.

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Don't think that too much care can be used in welding.

Don't use the "jump" weld unless absolutely necessary.

Don't forget that the slack tub needs cleaning occasionally.



A MACHINE EASILY MADE AND OF GREAT HELP

Don't do a lot of "fussing" on work that doesn't require it.

Don't forget that a tool table costs little and helps much.

Don't forget the allowance for welding when calculating stock.

Don't think that any one man knows all about smithing work.

Don't forget that a "hollow" fire is hotter than an "open" fire.

Don't spend a lot of unnecessary time on any piece of work.

Don't forget that sand makes a good welding flux for many cases.

Don't forget that even an apprentice can teach you some new kinks.

Don't pile a lot of fresh coal on an old fire full of cinders and "dirt."

Don't forget to heat slowly and evenly to insure easy working.

Don't forget that you can blow more air into the fire than is necessary.

Don't run out in the cold directly after a "hard sweat" at the fire.

Don't continually have a litter and muss about your fire and anvil.

Don't try to weld the thicker parts first; thin portions cool quickest.

Don't leave your tools lying around after you are through using them.

Don't forget that a welding flux will enable you to weld at a lower heat.

Don't start forging a piece until you know what you are going to make.

Don't try to keep the round stock round when drawing it out or pointing.

Don't start forging a piece of work until you get all the needed tools handy.

Don't forget that dies and formers will decrease the cost of duplicate parts.

Don't turn your work just before the helper strikes—turn it before your own blow.

Don't drive the cutting chisel clean through stock and onto the face of the anvil.

Don't depend upon what others have told you, figure out some things for yourself.

Don't forget that copper makes an excellent protector for your anvil when cutting stock.

Don't be afraid to open the doors and windows—a smith needs fresh air and sunshine.

Don't boast that you can forge anything from a needle to an anchor better than anyone else.

Don't forget that many tools can be purchased cheaper than they can be made in the shop.

Don't forget that a block of wood is an excellent thing to place in the fire when banking it.

Don't fail to square the round stock to the desired size and then round it up when drawing out.

Don't forget that borax and iron filings will "weld" sometimes when borax alone won't do.

Don't forget that you're not in business for your health, but rather be in health for your business.

Don't think that there is but one way in which to do a piece of work because you know only one.

Don't forget that several hardies and other little anvil helps can be hung on the sides of the anvil block.

Don't forget that a book of tables will save you much time and prevent mistakes when calculating stock.

Don't forget that it is much easier to do good work with clean surroundings than it is amongst piles of scrap and dirt.

Don't forget that the scrap pile represents an investment but at the wrong end of the business—keep it low as possible.

Don't forget that a piece of sheet iron on the floor in front of the anvil will save you much trouble and will protect the floor.

Don't think that because you've been in the same shop all your life that a new man can't teach you a new way of doing some of the work.

A Simple Shop-Made Emery Stand.

F. P. SCHAAF.

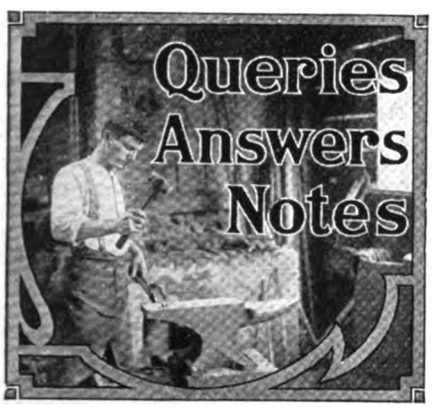
I have seen several engravings and descriptions of emery stands in the paper and take pleasure in submitting one of my own design. The parts were procured from an old bicycle. If these are not at hand, they may be purchased at a very small cost. The frame is of course a double one and is constructed throughout of 1¼ by ¼-inch stock. The two parts of the frame are put together by means of bolts run through pieces of gas pipe. By this means it is possible to tighten and brace the frame so as to allow little or no give or spring. The seat for the operator may also be taken from the old bicycle. I used an old seat from a binder. This answers the purpose very well. The top end of the longest piece is fitted with a T which is babbitted and in which runs the spindle for the pulley and the emery wheel. The bicycle part, consists of the hind wheel, the sprocket, chain and pedals. The wheel from which the tire has been removed, is hung in the frame by means of a large axle bolt. The crank is then hung as shown and the bicycle chain used to connect the sprocket attached to the wheel and that of the crank. A

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belt is now used to connect the pulley with the driving wheel and the machine is ready for work. By using the bicycle bearings in the three boxings, an easy running and very serviceable emery stand will be the result.

The General Shop of an English Brother.

That work of a general character is done in the shops of our English cousins is very evident from a glance at the accompanying engraving. This smithy is run by Mr. Sidney Gibbs. The work consists of general repairing, farm implement work, horseshoeing, vehicle work and the like and is sufficient to keep four men busy. The shop is of stone as are those usually found in the country districts of Old England. They appear to have been constructed with a view to permanency. As seen in the engraving, a sort of loft is used as a stock rack and store room. This opens just above the shop doors. The mowing machine in the foreground, it will be noticed, bears an extra long center pole, but is otherwise not different than our own farm implement.



The following columns are intended for the convenience of all readers for discussions upon blacksmithing, horseshoeing, carriage building and allied topics. Questions, answers and comments are solicited and are always acceptable. Names omitted and addresses supplied upon request.

Wants a Shear for Tin.—I would like to have some of your correspondents tell me the best way to make a shear for tin and sheet metals. EDGAR M. PERRY.

Wants to Temper Twist Drills.—Would some brother smith tell me how to temper twist drills that have been through a fire and are all bent and twisted? Can they be fixed? C. B. DICKEY.

A Machine for Cold Setting.—In answer to Mr. A. H. Blum in the April number; I think that the House Cold Tire Setter made in St. Louis, Mo., and advertised in this paper is the best, price and all considered. T. F. WATERS.

Gun, Rifle and Bicycle Parts.—In answer to Brother E. Keen, will say, he can procure gun, rifle, pistol parts and gunsmiths' supplies from Gus. Habich, 121 West Washington street, Indianapolis, Indiana. I find them a reliable firm to deal with. P. M. WADE.

On Brazing Castings.—If Mr. Wm. J. Rust will get a box of Welderine put up by the Welderine Co., of Topeka, Kansas, he will find all the information he needs with the case of Welderine. It costs only $4.00 and will do lots of work on broken castings, cog wheels or anything he wants, if he will just follow the instructions that he receives. T. F. WATERS.

Several Requests.—Kindly have Mr. Richardson explain his method of forging a goose neck band. I would also like to have some brother smith tell me how to make a square iron box out of iron 2 inches wide by ½ an inch thick and having the corners square. Perhaps, some of the smiths might have a better way than my way. THOS. LONG.

That Clinch Weld.—I see a new clinch for spring welding in the July number. I forgot that clinch 10 years ago, and if a smith can't weld a spring or a rake tooth without a clinch or rivet I would not call him a very good smith. I have been welding these pieces for 30 years, just the same as I would a piece of flat or round iron. E. L. MILLER.

Wants to Temper Machine Drills.—I wish some brother of the craft would give me some advice through the colums of THE AMERICAN BLACKSMITH about how to temper machine drills. The drill is a round one with eight teeth and there is a hole through the drill. I am a new blacksmith and I have trouble in tempering to make those drills stand. Can someone give me some information? GEORGE PETROFF.

Regarding a Gasoline Brazing Torch.—Will the brother who gave the description of how to make a gasoline brazing torch in the June issue, please give us a little light on it. I would like to know what length and also the size of the tubing used for the burner. Also, how is the small sized tubing which is coiled around the burner fastened to it and what kind of tubing is required? If the brother will kindly enlighten me on these matters he will greatly oblige, J. B. K.

How to Shoe that Mule.—Brother A. E. Thornton asks for a little information as to shoeing the hind foot of a mule where the heel does not come in contact with the ground by several inches. Shoe your mule with a good high toe, pull up a good solid toe clip to prevent the shoe from being knocked back and as the mule goes heavy on his toe use no heel calks whatever. This shoe will soon put the ankle and large tendons to work, and in a few shoeings he will step as he should. J. GRAVIS.

A Question on Horsepower.—I would be glad if some one of the craft would favor me by telling me the power I have with an upright shaft, on one end of which is a lever or crank 18 inches long. On the other end is a sprocket 6 inches in diameter and another shaft with a 12-inch sprocket on one end and a 12-foot sweep on the other end, with 2 horses on the sweep. A chain connects the large sprocket to the smaller one. What power will I have on the short lever or crank? J. A. G. MAXWELL.

A Letter from Missouri.—A few prices from Missouri: Horse shoeing, new $2.50; old $1.50; setting tires $1.75; axles $1.75;



THE ENGLISH SMITH ALSO OPERATES A GENERAL SHOP

wagon tongues complete $3.00; pole alone $1.75; buggy poles $1.75; pole and circle $2.50. All other work about 50 cents an hour. I see a number of brother smiths inquiring about power. I have a 4-H. P. Fairbanks-Morris Engine and will say that I would not do without it. I run a rip saw and a pony planer, emery wheel and post drill. I use my drill for boring down wagon spokes and felloes and other heavy boring. I have a small shop 20 by 36 feet.

A Letter From Indiana.—I have just built a new shop. It is 24 by 60 feet and two stories high. I started here about 4 years ago, and went into debt for tools and material for about $300. I paid that in one year, and then purchased a lot and building, paid $150 on it and since then have built a new shop and all I owe is $200. When I get that paid my property will have cost me about $2,000. Probably some smiths have done better, but I know a good many that have not even done as well. I like THE AMERICAN BLACKSMITH very much and expect to read it as long as I am in business. A. C. HARRINGTON.

How To Temper Cold Chisels.—I will try to explain my method of tempering cold chisels. It is probably old to some smiths, but it may help some of the younger craftsmen. After forging the chisel to the proper shape, sharpen it, and then heat to a cherry red. Dip it for about ¾ of its length into water, then take a dry pine stick and hold the edge of the chisel on this until the board scorches to a brown. Now dip the chisel and cool it at once. This will give you the proper temperature. If you desire the chisel any other degree of hardness gauge yourself according to the colors on the stick or board. If you desire the chisel soft allow the board to brown slightly more. HOLT.

Utilizing Waste Heat.—A subject which we have been giving some thought, and which we believe to be an important one to nearly every person in our line of business, is how to utilize the waste heat that is constantly going up the chimneys and into the tuyere irons from the forges, while we are at the same time paying out money for fuel for heating

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our wood shop, paint shop etc. Has any one ever solved a practical way of utilizing this heat? In our individual case, if it could be done, it would amount to a saving of from 3% to 4% a year on our investment. We would like to have this thoroughly discussed through these columns. VICTOR CARRIAGE & WAGON CO.

An Interesting Letter from Kansas.—We run a general repair shop and do every kind of work. Our equipment consists of 2½-horse-power Fairbanks-Morse gasoline engine, a trip hammer, an emery stand, a cut off saw, boring machine, a drill press, a Little Giant punch and shear, a Barcus shoeing rack, a pipe threading machine and have ordered a Brooks cold tire setter. Our side lines are galvanizing, well casing and tanks, which we make in the shop. We employ three men and could very easily use two more if we had the shop room. Our shop is only 36 feet by 36 feet, and we are quite crowded. The machines we have installed have been suggested to us through your valuable paper. K. & P.

Welding a Broken Axle Stub.—Mr. O. H's criticism in the July number is good except his reply to Mr. I. Van Tassel on welding an axle broken off square at the collar, for it can be done. Drill a ⅝-inch hole in each end about 1 inch deep. Forge a steel pin to fit the holes tight, Now cut a thin steel washer, heat both ends and drive together with washer in middle. Have a clean fire, use borax, go slow and weld by striking end against anvil block. Or let your helper hold a wooden block against the end and then strike. This can be done without much disfigurement and if you are careful, you will have a good job. I don't recommend this as a general thing but in an emergency it will work very satisfactorily if well done. H. BETTCHER.

Right and Left Hand Tongs.—Brother Van Dorin misunderstood me when I referred to a right and left hand tong jaw. I did not mean that it took a jaw with a shoulder on the right side and a jaw with the shoulder on the left side to make a pair of tongs. But I meant just what I said—to make the shoulder on one side you hold the iron one way and to make the shoulder on the other side you hold the iron the other way. Do you see the point? Of course the tongs must have the shoulders on the same side. Yes, Brother Van, I too have made tongs, but I thank you for calling my attention to the mistake. You say, Brother Van, that you punch the holes in all the tongs you make. I drill the holes because the tongs will then work smoother. CARL RUNGE.

A Business Card.—For a business card I use a large good sized card bearing my name and address and a cut of a horse shoe and bearing the following; The Eight Commandments of Dauray, the Horseshoer.—

Thou shalt honor thy horseshoer that he may not torture thy horse's foot.

Thou shalt keep my name in memory and forget all others in the same business.

Thou shalt not pay thy bill in bad money or say; "Chalk it down."

Thou shalt not steal by without stopping in.

Thou shalt have thy horse shod regularly, that he may not go lame.

Thou shalt not bear false witness against thy horseshoer, for he is always good.

Thou shalt not let thy horse go barefooted, for it is an injury to my business.

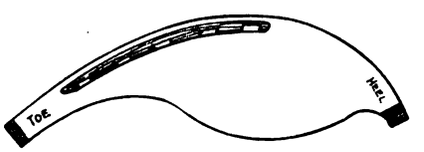
Remember the Sabbath and have thy horse shod on Saturday.

Obey all of these commandments and thou shalt be happy all the days of thy life. P. A. DAURAY.

A Letter from Ohio.—The Lien Law would undoubtedly be a very great help for all of us, but as I am very careful I do not have much trouble along the line of poor paying customers and bad accounts.

My shop is 20 feet by 30 feet, and two stories high. I find that this is much too small for my business. I have a Hercules 5 horse-power gasoline engine, which gives me very good power. I changed it from a hot tube ignition to electric spark, using a Motsinger autosparker. This device works very fine. I also have a 16-inch iron lathe, an 18-inch wood lathe, and other tools too numerous to mention. My work consists of repairing both wood and iron, and also the building of new work such as wagons, and the turning and ironing of whiffle trees and neck pieces. I have a home-made foot-power trip hammer, which is a great help at the anvil, and I am going to build a power hammer sometime in the near future. I do not have any shoeing to do but pay all my attention to the repair work. R. I. BURGETT.

A Shoe for the Jersey Bull.—I would like to know how you get along Brother Thornton. The accompanying engraving will show you what shaped shoe to use.



OX SHOES ARE MADE IN HALVES

It is the regular style ox shoe, and is made in halves. Kindly let us hear from you Mr. Thornton, when you have shod your jersey bull. J. W. METCALF.

Proper Dress for Working.—If you will loan me a little space in your paper I would like to write a few lines regarding the student in the picture on page 203 of the August number. His hands are muffled with a pair of gloves and he also wears an overshirt with the collar turned up. How can he stand to be robed that way and work over a fire? How cold he must be! It reminds me of an old saying "Hands muffled, Brains muffled." I have noticed it for the last 40 years and it proves a true saying. A cat with gloves can't catch mice. It is hard enough to work bare handed. Gloves make the hands tender and if they get sore at the beginning they will soon toughen. The one at the trip hammer goes at it in a workmanlike manner, stripped down to a working dress, he will make a good workman. I have had a good many apprentices and all have turned out to be good workmen. But never have any of them ever tried to work at the fire with an overcoat and long gloves on. I hardly ever criticise the dress a person wears but this is a little too much to let go without some comment. A. S.

Two Mules that Knuckle Over.—In answer to A. E. Thornton's inquiry will say, I have been shoeing two mules that knuckle over. The tendons in the pastern joint seem to be drawn and one of the mules' feet turned until the sole of the foot was behind and he walked on the front of his hoof. The way I first shod this foot was by using an ordinary shoe, setting it as for ordinary shoeing. I then took a piece of steel. 1½ by ⅜ by 3 inches and welded one end to the toe of the shoe and then gradually curved the piece until the other end touched the hoof in front, about half-way up. I shod the foot this way for about 8 months but the foot improved so slowly that I studied for a better way to hasten the cure. I then began shoeing with an ordinary plain shoe. I would fit the shoe with ordinary calks, punch an extra nail hole at the heel and thin the foot all it would bear at the toe but not any at the heel; I then placed the shoe forward about ¾ of an inch and nailed it securely. By this means I had the two mules walking nearly normal again within 6 months shoeing. P. M. WADE.

A Peculiar Case.—I have just experienced a peculiar circumstance. A horse was brought to my shop that has a very bad reputation, and has been whipped out of several shops. I shod him once but had to throw him. When the shoes had been on seven weeks one came off. and as the others were a little loose and needed tightening I threw him again He fell to his knees, then the hind parts fell over and when we pulled his head back he struggled to get up and struck the back of his head on the ground and his nose began to bleed. He was just as mad as could possibly be and even bit his own lips through and through for anger. When we let him up his eyes were crossed and blind and he is still blind. Does anyone know what to do for him, will he stay blind? Can his sight be restored and how long will it take to get results? The owner was present and does not lay any blame to me for the accident. Did anyone ever hear of a similar accident? Would like to hear from several brother smiths along this line. I shoe everything that comes along regardless how bad they may be but this is my first accident. H .T. F

A Letter from A Kansas Smith.—I have had eleven years experience at general blacksmithing and carriage work and must say I have made a success of it or at least think I have. I have made some money and started in business for myself, eight years ago. I now have one of the best shops in the country. It is 22 by 50 feet two stories high, with a new 4½-H. P. gasoline engine, a trip hammer, an emery stand, a power blower, a drill, a power spoke tenoning machine, a band saw, a rip saw, a wood saw, a Renold's tire bolter, two forges, a tire shrinker, two

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iron vises, one wood worker's vise, a swage block, one mandrel or cone, a shears, a levelling block, a breast drill, a complete wagon maker's and carpenter's outfit, a set of Little Giant dies, full mounted and other small tools of all kinds for wood and iron. I have a nice office with desk, telephone, filing cabinet, etc. I also have a good farm and a nice house and lot in town.

I keep one experienced man the year round at $2.50 per day. We do a great deal of shoeing and plow work, also wagon work and of course read with interest the articles on shoeing and plow work, especially about some of the swift fellows like brother McCoy. We are not quite as swift, as this brother but still, we get our work done. T. F. WATERS.

A Letter from a Pennsylvania Smith.—I came here last September without money or tools (except a few tongs and hammers). This place is seven miles from the nearest surrounding town and I had to build up a trade, the other smith having completely run himself out. I set to work in a small shop with a few tools, such as an anvil, bellows, vise, screw plates and a drill. These I purchased with borrowed money. I have now a good trade and do shoeing and repairing of all kinds. This was my first shop since serving 2½ years apprenticeship. I have had a nice run of wagon axles. These I lay out the same as brother J. W. Smith in the July number. This I think is an excellent method.

A practical list of the prices I receive here is as follows:

Shoeing from	.30 to $ .40
Bar shoes per pair	1.00
Resetting	.15
Bolsters	2.00 and 2.25
Axles from	2.50 to 2.75
Buggy tires per set	4.50
Wagon tongues	2.25
Reaches	.75
Sand board	1.00
Shafts for dump cart	2.00
Tire setting from	2.00 to 3.00
Spring welding	.50
Welding shaft irons each	.25

I have just received a Stoddard upsetter which is a good one. I have success with bar shoes on flat feet. CHAS. M. PROVIN.

An Interesting Letter from York State.—I have read many good articles in THE AMERICAN BLACKSMITH, written by men of much experience and whom I am proud to say would help any one of lesser experience, thanks to such men who take pleasure in writing such articles. There is no necessity for me to lay down any rules for the guidance of the shoer in correcting the gait of the forger, the knee hitter, or the interfering animal. The man with sound judgment and good reason, by reading these articles and comparing them with his way of thinking cannot help but do good work on a horse's feet. What more can be said of corns, quarter cracks, contraction, drop sole, or any and all the ills to which the horse's foot is subjected. If the shoer has not good judgment and the ability to reason carefully, he should let the horse's foot alone. The man of judgment will take time to think over the matter. Just think how delicately and tenderly the horse's foot is constructed and one is amazed at the amount of abuse the foot will stand. You can command the horse to execute all the movements necessary for driving, working, eating and drinking, but you cannot command him to stop forging, interfering and going lame. You must use your judgment and experience in correcting those and by reading and thoroughly digesting the good articles, which appear each month in the columns of THE AMERICAN BLACKSMITH, you should be able to do the horses much good. JAMES DOLAN.

Two General Shops.—The accompanying engravings show the general shop of Mr.



A SMITH SHOP WELL-BUILT

N. M. Golden located in Nebraska and also Mr. T. J. Schaife's shop located in Pennsylvania. Mr. Golden's shop is 24 by 40 feet. He runs two fires and has work enough for another man all the time. His equipment consists of a 1½-H. P. gasoline engine, an emery stand, a rip saw, a shear, a lathe, a drill, a wood



A TYPICAL GENERAL SHOP

bench and a Barcus shoeing rack. Mr. Golden has been located in the same place for four years, has worked up a good trade and has all the tools necessary for a general blacksmithing business.

Mr. Schaife's business is also of a general character. He does vehicle painting, repairing and building, horseshoeing, machine repairing and also bicycle work He occupies a well built shop and enjoys a good trade. T. A. B.

Still More on Cold Tire Setting.—Blows and punches come thick and fast, but I shall not dodge. I think I know my ground on cold tire setting but O'H. seems to be sparring for information on what he is evidently very much at sea. "What does he do when the spokes are loose and project above the rim?" This brother might with equal propriety ask, "When the rim is broken and the hub split?" The answer is given very simply in these three words, 'Repair the wheel.'"

I did not know that I claimed to respoke, rim or repair wood work with the machine and there is nothing in it to prevent taking off the tire when necessary. I have used my Henderson cold tire setter for four years. I know nothing of any other make, but presume that most of them do the same. I do some carriage repairing and would say that a large majority of the wheels need only a saw cut in the rim and the tire will tighten perfectly. This tightening can be done much better by measuring a loose wheel, guessing how the spokes will press in the hub and the rim, and how much dish there will be when the tire cools off. I will add that I have no interest in any machine or company and simply purchased my machine on trial. I found it O. K. and paid the price. Double that price would not take it away if I could not get another. I began carriage work fifty-five years ago when we made our wheels from forest stock by hand in the shop. I have no intention of going back to first principles again. It is much better now and I have not failed in trying to keep up with the times. S. L. LORD.

From A Texas General Smith.—Having read so many interesting articles from different parts of the country, but not having seen anything from this locality, I will give a few of our prices:

New Plow shares	$2.00
Landslides	1.00
Pointing plow shares	.50
Making mould board	2.50
Shoeing, 4 shoes	1.00
Resetting	.70
Cross Bar in shafts	1.00
Putting in buggyreach	1.00
Wagon Tongue	3.00
Pole Circle	1.00
Setting wagon tires	2.00
Setting buggy tires	2.60
Buggy or wagon spokes	.25
Buggy Painting	8.00

We make quite a lot of new plow shares but I fear that I can never make them as fast as the brother up in the wheat belt. He says he can make a share in tnirty minutes and have it on the plow. It takes me from one to two hours to cut out and finish up a plow share. We make all our large shares of 5-16-inch crucible steel.

Mr. Tune, the man for whom I am working has a well equipped shop for doing most anything likely to come in. He has a six horse-power gasoline engine that furnishes power for three fires, emery wheels, trip hammer, drill, band saw and pump. Mr. Tune also carries a small line of hardware, paint etc. as a side line.

In my experience in buggy painting I have always found it a paying business as there is invariably quite a lot of repairing to do on a buggy before the painting can be done. C. E. MASSENGALE.

Case-Hardening Iron and Steel.—In answer to Mr. Coad's query in the July issue regarding the case hardening of iron and steel, would say, there are many ways of doing this, but there is only one correct method. This method is expressed as follows: Remove the soles from several pairs of discarded shoes, being careful to have the leather free from oil and grease. Cut the leather up in small pieces and place it in an iron kettle having a tight lid. Now put the kettle over a slow fire and bake the

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contents thoroughly. Care must be exercised, however, to prevent the leather from burning. The leather is now pounded to a fine powder and a box plenty large enough to receive the stock to be case-hardened is made of sheet iron. This box should also have a cover fitting quite tight. Now cover the bottom of the box for about ¾ of an inch with the charred leather and place the work to be case-hardened upon this. The work should, of course, before placing in the box, be burnished with a fine emery cloth and care taken in handling it, as the oil or perspiration from the hand will prevent entire success with the work. After placing the work in the box, fill the box to the top with charred leather, packing the latter carefully about the work. The cover is now placed on the box and the crevices carefully filled with clay. Now build a fire of charcoal in your forge and, after getting it thoroughly started, dig a hole in the center of it and sink your box in this with the cover up. Now turn on your blast and bring the fire up carefully and easily until it is very bright, then stop the blast and allow the work to remain in the fire from 6 to 10 hours. Now secure a vessel which is thoroughly clean and fill it with clear spring water and when the work is ready, open the box and drop your work into it, continually stirring the water until the work is cold. By this method you can make the iron hard enough so it will cut glass. E. JOHNSON.

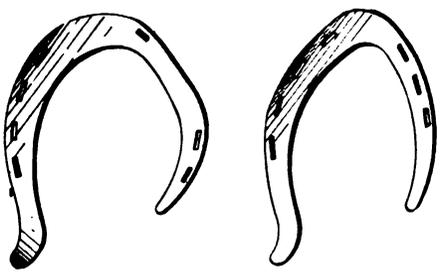
An Interesting Colorado Letter.—In the June number of THE AMERICAN BLACKSMITH appears two articles on shoeing forging horses. The two writers seem to differ somewhat. In Colorado we favor D's opinion by shoeing heavy in front with short toes and high heels and light behind with long toes and low heels. However I shoe one horse just the reverse. It is a rare exception to the rule.

I like Mr. O. H's article in the July number. I dare say that he is a mechanic possessed with good common sense. If some of our brother smiths would use even common "horse-sense" they would not have to ask so many foolish questions. Perhaps I am just a little out of my class in writing this article for I have been in the business for about six years but I do not take a back seat for any of them. I just worked in my first custom shop (where I still remain) a few months when my employer took up the hardware business leaving me to run the shop which I did for three years. I then bought him out and am still doing business at the old stand. I do anything that comes my way, from brazing cast iron to building automobiles. I built an auto for myself last winter and it runs too. It has always brought me home.

One smith asks how to case-harden wrought or cast iron. My method, is to heat the metal to cherry red, coat it freely with prussiate of potash (yellow). Now heat again to cherry and plunge into slack tub. Follow this method and if you have a file that will cut it, the file must be a good one. For tempering, I use nothing but plain water or oil, none of the tempering solutions for me.

Mr. O'H. in the July AMERICAN BLACKSMITH expresses my sentiments exactly on the cold tire setting question. They are a good thing on heavy wheels where the tire is not very loose, but take them away for carriage or buggy wheels where the spokes are loose in the rims. It is nonsense to say one can stave a long spoke down in the rim simply by striking on the tire. Come again Brother O'H. I like to read your writings. F. W. S,

A Short Talk on Shoeing.—Having noticed an inquiry in your August journal from Brother Holt asking how to temper hand-hammers will give the brother my



TWO SHOES FOR THE INTERFERING ANIMAL.

method which I have used for years on all kinds of hammers. First, insert a pair of tongs in the eye of hammer. Then keep turning the hammer in the fire until the face and pene are a cherry red, leaving the ends a little brighter than the eye. Now plunge into water until cold. That is all that is required. Where the grade of steel is uniform and of good quality this is the easiest and best way and uniformly successful.

In regard to making shoes for forgers: I have numerous shoes designed for the purpose, as I find that shoes that stop one animal will not always stop another one, so I change my methods to suit the gait of each one that travels a different gait.

Brother Holts' method for interfering is O. K. But I frequently use side weights. If Brother Holt will trim the horses' feet so that front and hind are both the same length from coronet to point of toe, he will be onto the job. When hind feet are too short allow the hind shoe to project over enough to make the front and hind the same length. That method will very often obviate the difficulty with an ordinary shoe. GEO. F. WHERRY.

Regarding Shop-Made Band Saws.—read your paper month by month with much interest and therefore it is only fair that I should add to the store of knowledge you disseminate so ably. My object in writing this is to tell your readers not to follow Mr. Cary's example if they want a band saw for downright good shop work. Some years ago a man came to our works and said "I want a cheap band sawing machine." I got some quotations but they were all too high for my customer who was an amateur boat builder. He suggested a saw similar to that represented on Page 205 in your August issue. I went into the matter and in the end built the saw for which I received six pounds ($29.20). It did the work, which was very light, in good style, and therefore when a similar inquiry came to hand from a local brewery I had no hesitation in taking on a second order. The result was an unqualified failure. My saw absolutely refused to work through the hard wood used in the cooper's shop. I spent hours and days over the wretched thing and after incurring a loss of more than ten pounds ($48.66) it had to be removed and was scrapped. That saw was the nightmare of my earliest days as a work's manager. I sent in my resignation but my "boss" being an older and wiser man sent for me and told me to go on with my work. "When," said he, "Your losses exceed my limit, you'll hear from me"

Looking back to the incident I have come to the conclusion that you cannot get with wood and wrought iron the rigidity necessary for band sawing. In deep work such as felloes or cask staves there is a tremendous side strain which when complicated with vibration is fatal to the saw which breaks on the least provocation. AN ENGLISH READER.

Several Questions and Answers.—I am going to ask some questions and also give a few shop kinks.

I see in the August number that Brother Holt wants to know how to temper hand hammers. After dressing the hammer let the hammer cool and then heat the face of the hammer slowly to a low cherry heat. Now dip in soft water, not too cold and hold there until cold. Then brighten the face up with a file or stone and then get a large nut or chunk of iron with a hole in it the size of the face of the hammer or something near it. Then heat the nut, take from fire and hold the face of the hammer down in the hole until the outer rim of the hammer comes to a good sky blue then remove it. The reason I use this method is because you can have a good hard centre in your hammer and the outer rim will not be too hard, consequently your hammer will not get hollow in the centre and you will have a good temper too, if these directions are followed right.

The difference between foot founder and chest founder. I would like to ask. some brother smith through these columns if there is such a thing as chest founder, and if it will come from the same neglects as foot founder or laminitis. Do diseases of the body effect the front feet of a horse and not the hind ones? I would be very much obliged if some able farrier or smith would answer this for me.

A constant reader also in the August number, Brother H. B. Freeman, writes about a valuable wheel preserver and speaks about painting the rim with tar but does not mention the kind of tar he uses. It may be pine tar or coal tar or white pine tar. It might help some of us if he would tell us the proper tar for the job. C. CRAIG.

In Answer.—Replying to Brother Craig as to the tar to be used for preserving wheels; when purchasing the tar or paint to be used for this purpose, ask for "Tar paint" or "Coating." The same thing is often used for coating roofs and is of course a coal tar product. H. B. FREEMAN.

A Letter from a Wheelwright.—I was very much interested in reading Mr. Bupp's letter on tire-setting as we have

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a great deal of tire-setting to do out here in this hot climate. I find that I have better results by staying by the old measuring wheel. The compass is all right for use on straight work but on the circle of a tire I find that I cannot trust them, especiall yon light wheels.

In fitting up a wheel that has got back dish: after I have it ready for refitting the tire, I then take a rasp and carefully rasp off the back edge of it all the way around. Then I measure the wheel, fit the tire and put it on. You can see that lowering the back edge puts all the draft on the front edge of the rim and draws the rim to the front instead of to the back.

I am bothered a great deal with short tenons on spokes. Some men, in fitting up wheels, cut the ends of the spokes way below the face of the rim and I find that this causes lots of trouble, for as soon as the spokes settle upon the shoulder a little it gets loose and then rattles and still the tire will be tight on the rim or is rim-bound. I believe that the end of the spoke should rest on the tire the same as the shoulder does on the rim. And just here is when a man must understand his business so that he can properly, fit up his wheel with the bearings all just right when done. The shrinking of the tire and making it the proper size for the wheel is one of the least essential parts, in tire setting.

Our prices here are as follows:

Common shoes, per set,	$ 1.50 to	$2.00
Bar shoes, each		.50
Resetting,		.25
Light tire setting,		3.00
Heavy tire setting,	4.00 to	6.00
Half Rim,		1.00
Spokes,		.25
New Tires,		7.00
New Stubs,		8.00

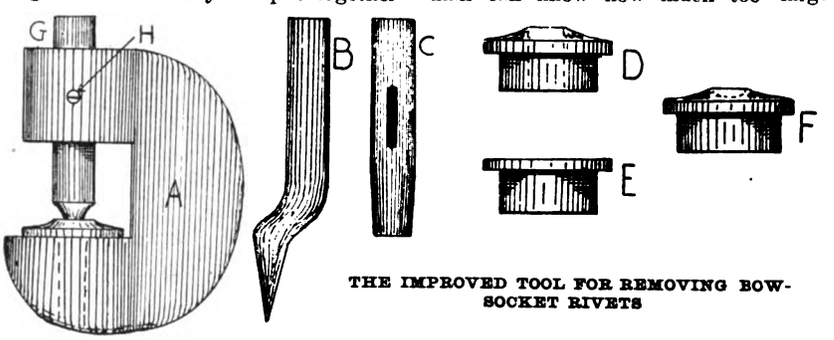
We pay $20.00 for our coal and $3.00 on an average for men. Wood stock is very high here, hickory is from 12½ to 15 cents per foot, wagon tongues, half fine, $2.75 each, and other things in proportion. M. H. MAYBURY.

A Few Criticisms.—In the July number of your excellent journal, Mr. W. A. Short illustrates a handy tool for punching old rivets out of bow sockets, but it is not so mechanically perfect in construction that it could not be improved by having the punch loose in the upper jaw instead of being a solid part thereof. It is however superior to the one given us by Mr. Nablo in the August issue. Besides having the defect of a solid punch found in the tool of Mr. Short, the lower, or backing jaw, is too flat and large to permit the tool to bear only around the rivet head. They are both crude attempts at getting up a tool that surely would fill a long felt want. Mr. Nablo's effort will not do at all. While Mr. Short's is to the fore and fairly good, it is liable to cause trouble by the punch route.

The advantage of a loose punch is obvious. It should be made with a shoulder with the smaller part fitted in the hole. It can then be pressed as tightly against the rivet as if it were solid, and should it become battered or broken, it can be taken out and dressed, or replaced by a new one without much trouble. The backing jaw should be cone shaped.

Last May I was granted a patent on a tool that covers this rivet question about as completely as it can well be done. The tool is about six inches in length weighs 4½ pounds, and is the only thing I have yet seen that covers every detail of the bow-socket rivet problem.

I could weld at least three springs while Mr. Wm. P. Carroll is getting his clinch ready, and I would have a better job on all three of them than Mr. Carroll or any one else can get with his out-of-date clinch. Mr. C's. clinch has six laps to weld down, not to speak of the splits. In taking his heat he has two thicknesses at the weld and only one thickness immediately at the end of his lap. How can he get a right heat on this double thickness without wasting to some extent the single thickness? Why does he upset the ends? Is it because he fears that the regular thickness of the leaf would not be sufficient, though doubled, where he is to work on it? No, that is not the reason. He has no reason for it if pressed hard for a legitimate answer. He, like others who do not stop to ask themselves why they do it, upset it at the end because others had done so before them. Because in old times our fathers carried corn in one end of the sack and a stone in the other is no good reason why we should continue the practice. To properly weld springs they should never be put together before they are put together



THE IMPROVED TOOL FOR REMOVING BOW-SOCKET RIVETS

permanently on the anvil with a good welding heat. This idea of splitting, riveting, clinching and other time-killers and producers of bad work were turned down by good smiths a century ago. Granting that his old style is good, the proper place to upset his pieces would be from one to 1½ inches back from the end, thus making the leaf heavier where the weight is needed and at the place where a single thickness has to stand for a heat that brings a double thickness to the welding point. Above all things, shake off the habit of taking "sticking" heats. The "sticking" habit is not acquired; it is with you at the beginning. As time goes by and you become more confident and bolder, you ought to try welding your springs as we do our steel axles, or two pieces of iron: Heat them separately in a clean fire, take them to the anvil,—your helper with one piece and you with the other—and weld up and finish in that heat. You may not succeed at first, but it is worth burning up a dozen good axles and ten dozen springs to finally accomplish it. Once you have done it you will have no trouble in doing it again. In welding axles or other steels that you are afraid will slip, I would advise the use of scarf illustrated by J. C. Lamon in the July number and shown on page 24. R. O'HEARN.

A Good Talk on Tire Setting.—Our good friend Mr. M. W. C. Bupp in the issue for August brings the question of tiresetting before the readers of THE AMERICAN BLACKSMITH. He tells of some troubles we all have with wheels, and asks what we, who are "sitting on the outer edge of the circle" may have to say on the question. I too have worked on wheels; in the U. S. for 38 years and in Europe a number of years, have handled as bad wheels as our friend has seen. But early in my career I learned how to "guess" properly, and I usually get the dish as it ought to be. But I make sure before a wheel leaves the shop that I do not have to "fix it up some way" before it goes out. If my tire is "a bit too large." I remove it and set it over, and then if it is not right, I do it over. No customer ever comes back to show me a wheel that I have spoiled. It costs a good deal to always do good work, but one has the satisfaction that even if the pocket is not so full, the reputation is satisfactory, and no one is afraid to trust such a mechanic with the most difficult piece of work.

The dividers or compasses have no place in the measuring of a tire. No man can know how much too large or too small a tire is without measuring the circumference of the wheel and we cannot do that with the compasses. Therefore we use the only tool we have that will do it correctly—the traveller. Having used that on the wheel, we cannot use any other tool for measuring the tire so we use it here too. Then there is no guessing, except as to the stiffness of the wheel whether it will stand large or small draft. If the wheel is strongly dished we cannot give it quite $\frac{1}{16}$ of an inch draft; $\frac{1}{32}$ is enough. Less than that would practically leave the tire loose, and the customer might have reason to think the job was not properly done. It is better however to leave the tire with slight draft than with too much. The latter may spoil the wheel so it cannot be remedied, while a loose tire can be tightened.

In the case of an overdished wheel it is necessary to force all the spokes into the hub as far as they will go, pro-

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vided they are loose there. All the tenons must be tight in the rim, otherwise you cannot get the rim the right length. If the rim is too long, carefully cut it at the joints till the ends barely touch each other, making a good nice fit. Then as said before set the tire with the smallest draft you can use, about $\frac{1}{32}$ of an inch and you will have as good a job as can be made, for while you have not taken out any dish (which you cannot) you have not spoiled the wheel.

A backdished wheel is something quite difficult to say just how to treat but it is necessary to cut out a great deal at the joints. Spokes must be brought into the hub as far as they will go, the tenons must be made tight in the rim. One may have to cut out as much as $\frac{1}{4}$ of an inch and possibly give as much as $\frac{1}{4}$ of an inch draft, put the tire on and turn the wheel over, face up, screw the hub down till you have the right dish and let cool. As the wheel may be contrary you may have to do the work over again. If so, I usually saw out some at the joint before removing the tire, to make it come off easier. Then you may possibly have to cut out still more—give the tire as good draft as before and replace it, screw down as before, and probably this time you may have it right. A backdished wheel must be given a liberal amount of dish the right way or it will go right back again. Often they do so no matter what you do to them. Then the only way to fix it is to put on another wheel. C. A. HELLERSTEDT.

A Good Letter from the Capitol.—I want to ask the readers in the different parts of the country if they think it will be worth while for us to make souvenirs of a lot of old boiler tubes from the White House. I could cut them in short pieces for napkin rings and have them nickled for about 10 cents each. Or I could flatten them and punch them out to about the size of a dollar, or any size from $\frac{1}{4}$ to $2\frac{1}{2}$ inches, with a small hole in the centre. We could stamp most anything on it for 10 cents each.

E. A. asks for a good receipt for tempering cold chisels and drills. There is nothing better than clear water. Henry Coad asks what to use for case hardening. For ordinary work, red prussiate of potash is the best. But there are ways of more thoroughly hardening or deeper hardening the iron. The most approved is to have a cast iron box with a tight fitting cover. Pack the work in this box with ground up bone, heat to a red heat and keep hot for from 10 to 24 hours as the case may require. I have seen it harden nearly $\frac{1}{8}$ of an inch deep, while the potash does not go the thickness of a sheet of ordinary paper. But the potash is used more than the other and is very little trouble. Just heat the iron to a red heat, and cover with the potash. Then heat slowly again or cook in the potash slowly, heat up a little more and then plunge in cold water.

Edward Larson tells how he tempers chisels for granite. It must certainly be a very poor quality of steel to require such treatment.

James A. Klees tells how to measure for a ring, but his way will not work in his example. The stock will run nearly two inches short. Then again his method takes too much time to figure out and he does not allow enough stock to weld, if it is to be a neat job. The simplest way is to multiply the inside diameter

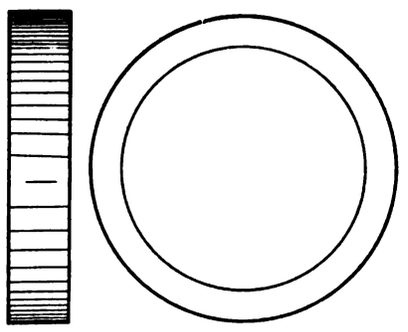


TO PREVENT THE SCARF FROM SLIPPING

and once the thickness of the iron by three and an inch for every seven in diameter. This will be as near correct as a smith will have occasion to work hot iron. The example he gives would be; 5 feet=60 inches + 1 inch (thickness of iron) = 61 inches x 3 = 183 inches + $8\frac{5}{7}$ = $191\frac{5}{7}$ + $\frac{1}{2}$-inch (for welding) = $192\frac{3}{4}$ inches.

A more perfect way is to mulitply the diameter from centre to centre of iron or the inside diameter and once the thickness of the iron by 3.1416 and allow for the weld. You see the first way is less than $\frac{1}{8}$ of the exact measurement and for ordinary use is very simple. You can do that in your mind for ordinary work. I can tell in a few seconds what it takes for a ring without figuring at all.

Mr. James Werner speaks of the credit question. All of my business is credit. If we did not do this we would have to give up in a month and I think it the best way when you have good customers. It saves both you and the customer a lot of trouble and the customer will get a lot of stuff that they could and would do without if they had to pay as they went. We have never lost anything to speak of by credit. Of course there are people that can't get credit but don't hesitate to tell them so if you have reasons to think they are not all right. We



TO MEASURE STOCK FOR RINGS

are not bothered with cheap work. We have a rate and stick to it. What you should not do is to "soak" a fellow when you get the chance. There is a large shop here we thought we stood in with. That is, we thought they would do right by us. As we were rushed with work we sent 16-$\frac{7}{8}$ bolts to have 3-inch threads put on. They charged us $2.00. A man getting $3.00 a day did it in $1\frac{1}{2}$ hours. This was done by the shop that is pointed out as the under bidder and justly so. But most of our work is done without ever asking a price and they know they will get treated right. But do you think any one will trust the shop that charges $1.33 an hour for a $3.00 man, when he is working for a friendly competitor?

Mr. Holt asks how to temper hand hammers and says he sometimes gets them too hard and sometimes too soft. This may be due to the steel or may be the difference in the one using them or the different work they have to do. For ordinary conditions the hammer should be heated evenly and thoroughly all over. Then turn the face down in the fire until the ball cools to as low a heat as it will harden at. Then cool off the ball clean up in the neck, till the face is to as low a heat as will harden, by this time the ball will be cool enough to let the face be cooled off nearly altogether. Now turn one end down and then the other end and continue a few times till both ends are about the same temperature. Then polish and let the color run till it is mixed with purple. The ball end may be harder, it doesn't matter much about that for it is not used so much and there are no corners to chip off.

Mr. P. D. asks about power with plenty of wood and trash that is around such a shop. I would advise steam. It takes a little time to get up steam but it is reliable and can be used for so many different things; heating the shop and house (or some one elses house if they are near). Then you have hot water all the time, you can run a steam pump or test an engine and many other things. A man can help and fire the boiler too. I worked in a place where my helper fired the boiler for a large machine shop and it did not interfere with my work hardly any. If you get a boiler two-horse power larger then the engine you can burn any kind of trash. I have seen a thirteen-horse power boiler run all day on ashes from the forge. Some think that it costs as much with a light load as a heavy one, but this is a mistake. The heavier the load the more fuel it requires. All the powers are safe if they are treated right. Electricity doesn't require any knowledge to operate it. The company will do all of the mechanical work and can show any one in a minute how to take care of it. If you use electric power I advise independent motors on each machine. It will cost a little more to start but will be cheaper in the end, as you just use enough current for the machine in use and have no line shaft to run. Then you can move the machines or forge without trouble. Probably this would cost too much and would cost more to fit the old machines. P. D. does not say what he wants to run, but I should think a four-horse power engine would do, if he has been running with hand power. Don't get a smaller engine for when you put in power your business will grow, if you let it.

Brother Keen asks where he can get bicycle supplies. Kesler's Supply House, 605 E. St. N. W., Washington, D. C., carries a complete line and is a perfectly reliable place. Kesler's is a strictly union place. R. E. STEPHENSON.

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ASK YOUR DEALER FOR THEM

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Prices Current — Blacksmith Supplies.

The following quotations are from dealers' stock, Buffalo, N. Y., Oct, 1, 1906, and are subject to change. No variations have taken place since last month's quotations.

All prices, except on the bolts, are per hundred pounds. On bars and flats prices are in bundle lots.

Bars—Common Iron and Soft Steel.

¼ in..	round or square;	Iron,	$2.80;	Steel,	$2.80
⅝ in.,	"	"	2.40	"	2.40
½ in.,	"	"	2.20	"	2.20

Flats—Bar and Band.

¼ x 1	in., Iron	$2.40;	Steel		$2.40
¼ x 1½	in., "	2.80;	"		2.80
3-16 x 1½	in., "	2.50;	"		2.50

Norway and Swedish Iron.

¼ in., round or square	$4.90
⅝ in., " "	4.50
½ in., " "	4.30
¼ x 1 in	4.80
¼ x 1½ in	4.20

Horseshoe Iron.

For No. 1 shoe, ⅝ x ½ in	$2.50
For No. 2 shoe, ⅝ x ⅜ in	2.50
For No. 3 shoe, ⅝ x ⅝ in	2.50
For No. 4 shoe, ⅝ x ⅛ in	2.50

Toe Calk Steel.

½ x ⅝ in. and larger	$3.00

Spring Steel.

⅝ to 1½ in. Rounds. Op. Hearth $3.00, Crucible $5.00
1¼ to 6 in. by No. 4 gauge to ½ in. Flats " 3.00, " 5.00

Carriage Bolts. (Net Price per Hundred).

¼ x 2	in	$0.54	⅜ x 2½	in	$0.82
⅜ x 2½	in	.58	⅜ x 3½	in	.96
¼ x 3	in	.62	⅝ x 6	in	1.31
5-16 x 2	in	.65	½ x 4	in	1.70
5-16 x 3	in	.75	½ x 6	in	2.10

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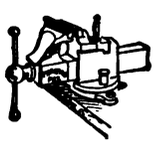
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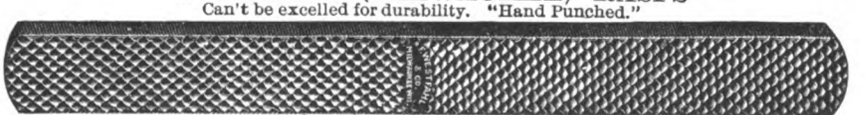


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Our new 18 inch rasp. Round ends.

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Remember we guarantee it—money back if it fails to do what we say it will. Price $1.00 per can.

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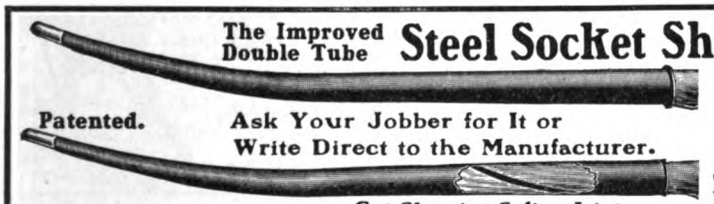
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The Improved Double Tube **Steel Socket Shaft End.**



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Gives your customer best value for his money.

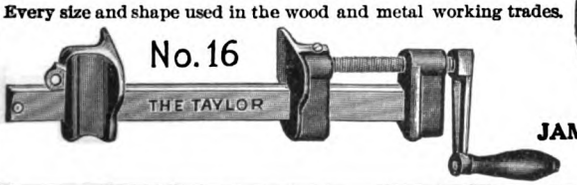
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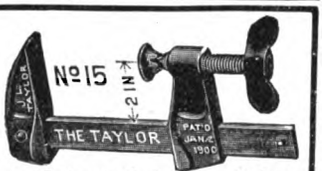
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Quick-Acting, Self-Locking.

Every size and shape used in the wood and metal working trades.





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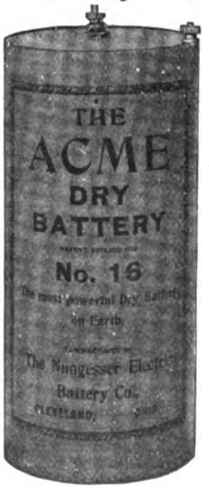
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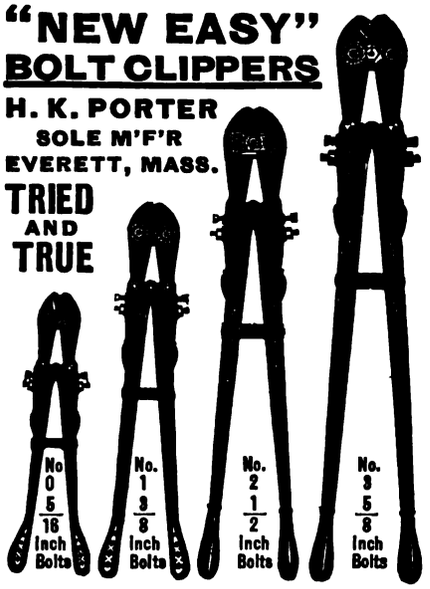
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REFUSE CHINESE IMITATIONS OF THESE TOOLS; THEY ARE INFERIOR.

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WITH 4-IN. TIRE STEEL WHEELS

Our wagons are well ironed throughout—wheels made with round staggered spokes.



We make any size wheels to fit any skein.

We manufacture a complete line of metal wheels for corn planters, cultivators, plows, etc.

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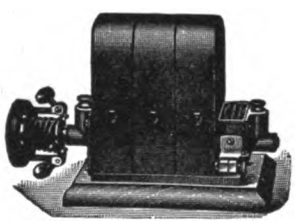


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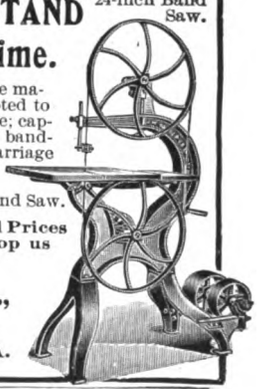
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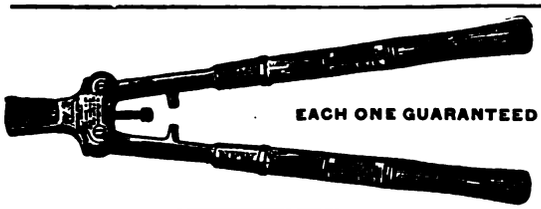
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A well-made, accurate machine; especially adapted to run by gasoline engine; capable of all kinds of band-sawing, particularly carriage repair work. These are a few of the fine points of Marston's Band Saw.



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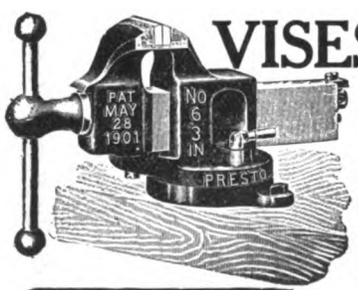
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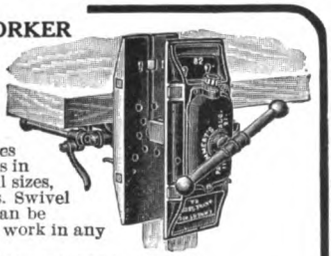
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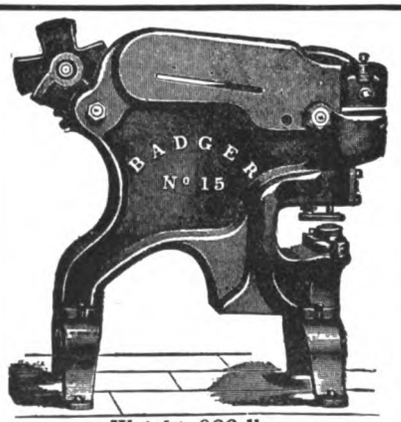
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Our patent Universal Vises are used in the best shops in the country. Made in all sizes, all styles for all purposes. Swivel or stationary bottom. Can be quickly changed to hold work in any convenient position.



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Weight 800 lbs.

Mr. Blacksmith:

Here is a Punch and Shear that will punch and shear just as we say with

ONE MAN ON LEVER.

Punch 5/8 in. hole in 1/2 in. Iron
Shear 4 x 1/2 in. Flat Iron
" 7 x 1/4 in. Band Iron
" 1 in. Round Iron.

Write for Prices, Etc.

Rock River Machine Co.,
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A GOOD SIDE-LINE

Hundreds of blacksmiths are making large profits by selling these blades. Each one is fully warranted. Made of Sanderson Steel.

Round or riveted. All sizes from 5 to 8 inch.
Handles ready to put on, 1c each.

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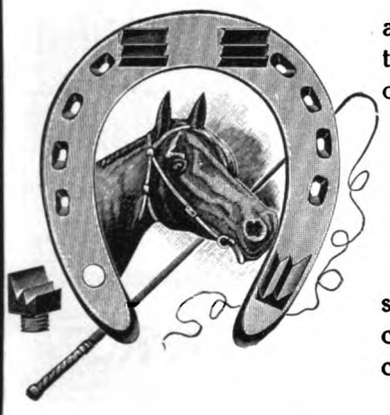
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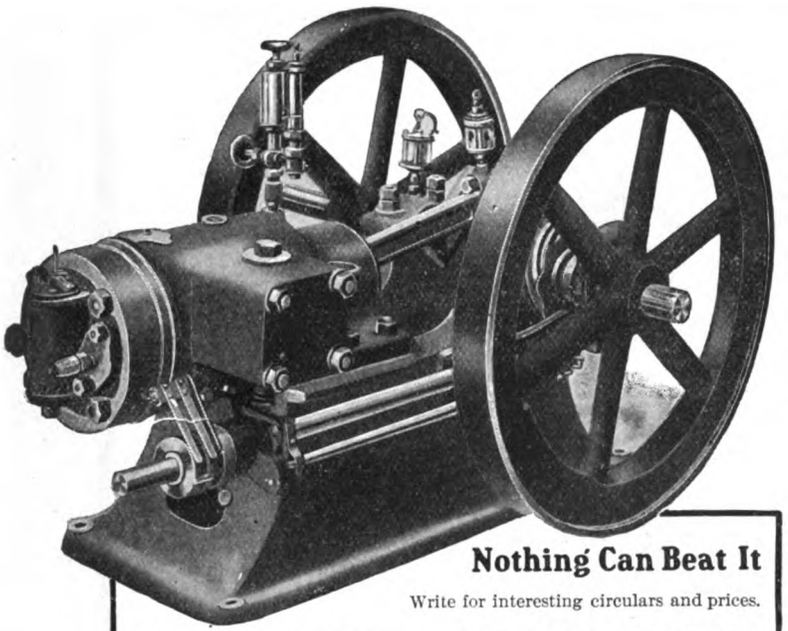
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Is the simplest, most durable and most reliable on the market.

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COMBINED

Punch and Shear.

The Most Powerful Lever Punch and Shear Made.

5 Punches and Dies with Each Machine.

MADE IN THREE SIZES.

No. 1—Will punch 5/8-inch hole in 1/2-inch iron. Cuts iron 5/8-inch thick and 1-inch round. Weight, 515 lbs.

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No. 3—Will punch 3/8-inch hole in 3/8-inch iron. Cuts iron 3/8-inch thick and 3/4-inch round. Weight, 280 lbs.

Only ONE operation of the Lever does the work. No changing required.

Note the improved Stripper and Hold-down. This machine is made for the blacksmith shop, and we DO claim that it is decidedly the best on the market for that place.



For Sale by your Jobber. If not, Write Us. Send for Circular.

Little Giant Punch & Shear Co., Sparta, Ill.

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Are Sold by the following Leading Jobbers

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That will fit the spindle of your drill press, holding drills ⅛ to ½ in. inclusive, with reducer to ⅜? Drills held by this chuck are much cheaper than drills with ½ in. or ⅝ in. shank. Simplest and cheapest chuck on the market.

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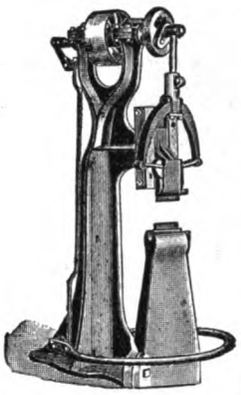


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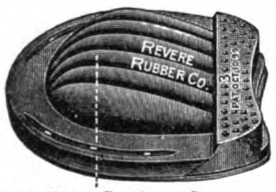
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Universal Tenon AND Boring Machine
for wagon repair shops. Cuts tenons on set of wheels in 12 minutes.

Vulcan Power Hammer,
Only perfect adjustable stroke, operated entirely by treadle.



AIR CUSHION RUBBER HORSESHOE PADS



See That Cushion?
It fills with air at each step. That's what breaks concussion. That's what prevents slipping. That's what keeps the foot healthy. That's what cures lameness.

Twelve Different Styles



Heavy Leather Back

NO LAMENESS NO SLIPPING CHEAPEST AND BEST



Medium Canvas Back

REVERE RUBBER CO.
Sole Manufacturers BOSTON, MASS.

We make the following sizes:
No. 1, 3 In. wide, 14 in. high
" 2, 3¼ " 14 "
" 3, 3¼ " 10 "
Price, $1.65 per set of 4 stks
Cash with order. Weight, 16 lbs. per set.



The Bruce Malleable Wagon Standard

This Malleable Iron Bolster Standard has been tested thoroughly, and we guarantee it strictly as represented.

Anyone familiar with the farm wagon will readily see the great advantages of the Malleable Iron Bolster Standard over the old style.

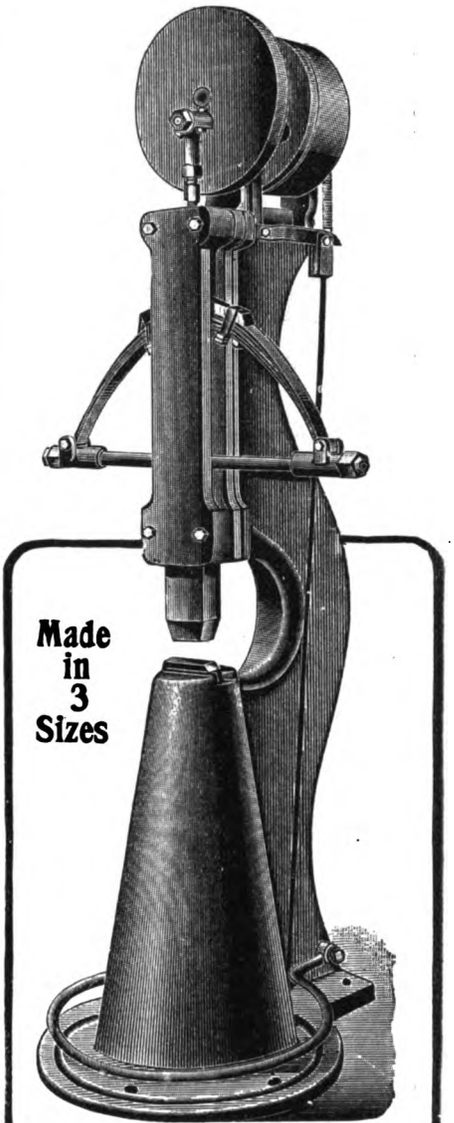
1. Made of the best grade malleable iron. It has been thoroughly tested by factories and wagon makers and pronounced a great success.

2. It is attached to bolster by means of two bolts passing through bolster from the side, and one bolt from top to bottom of bolster, thus holding standard perfectly solid, and at the same time strengthening end of bolster, which in old style is weakened by mortise.

3. The Malleable Iron Standard has a 3 1-2 in. face at base, which prevents wear on wagon box, while the old style has only a 7-8 inch face.

4. Great time saver. Can be attached to bolster in one-fourth the time required to put on wood stake. Adanted to new and repair work. The price will justify all classes of the trade in using this standard.

A. H. HARSHBARGER, Bement, Ill.



Made in 3 Sizes

The Perfect Power Hammer

has no equal for simplicity and efficiency. Does a wide range of work from the lightest forging to heavy axle welding. Note the long guides, insuring a direct vertical stroke. No side motion. Easy to operate from the lightest tap to the heaviest blow. The Disk Attachment free. No other Hammer has this advantage. It only requires one Horse Power to run it. Write for prices.

Macgowan & Finigan Foundry & Machine Co.
ST. LOUIS, MO.

Scott's IXL ALL High Speed Steel

Will cut at least one speed faster than any other high speed steel on the market.

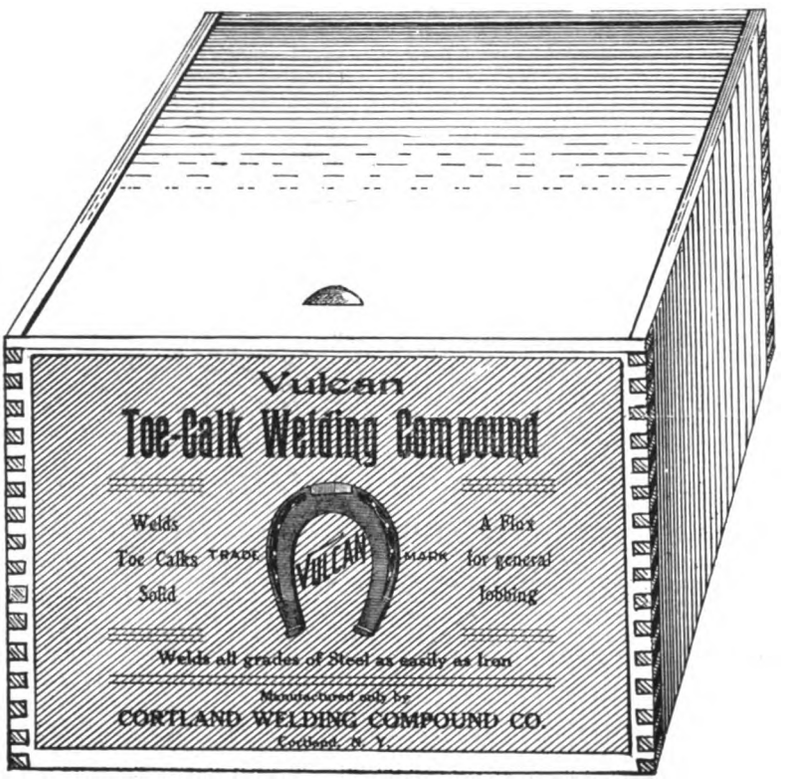
Write for Catalog covering entire line of SCOTT TOOL STEELS.

THE BOURNE-FULLER CO., Cleveland, O.

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WELD YOUR TOE CALKS

SO THEY WILL NOT KNOCK OFF



For Sale by Dealers in Blacksmiths Supplies

SAMPLE FREE

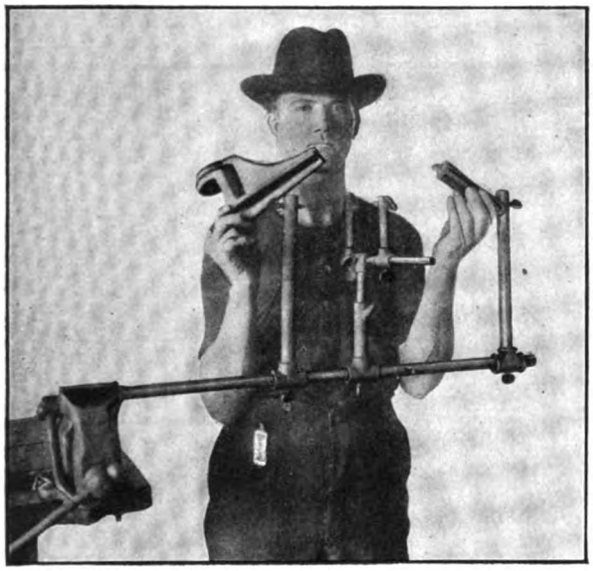
To Any Blacksmith in United States or Canada

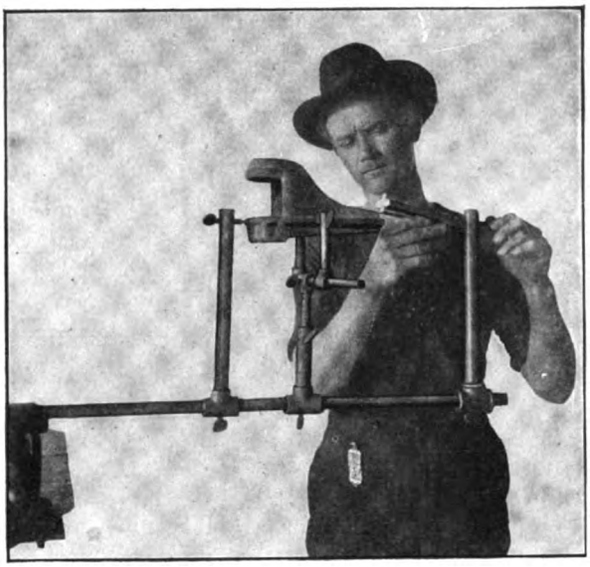
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CORTLAND WELDING COMPOUND CO.

CORTLAND, N. Y.

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WHAT IS A BRAZING COMPOUND WITHOUT SOMETHING WITH WHICH TO HOLD YOUR WORK

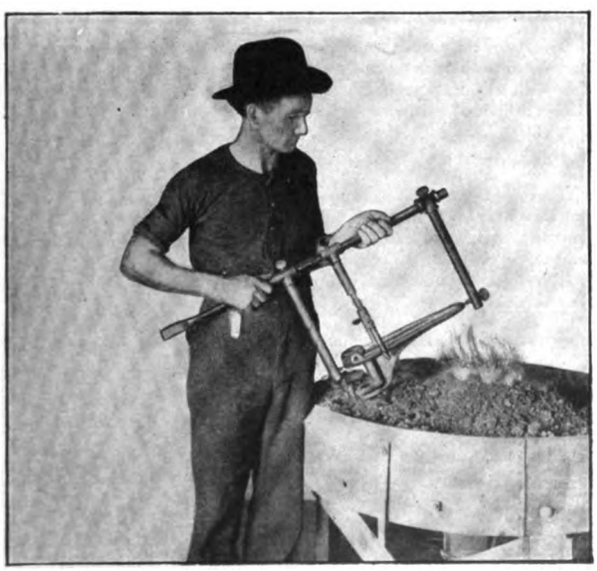
Nearly as bad as a wagon without a tongue. You have had experience and know. It's hardly necessary to tell you again but it's so true that you cannot braze one-third the castings that you would like to braze, that we cannot help saying so for fear that you may have never bought any Brazing Compound and think when you get the compound you have the brazing problem solved. It is not so, your troubles have just begun. No compound will hold the work and it has to be held. The photographs here show a casting that weighed 10 lbs. that was brazed in ten minutes. He got one dollar for that piece of work. The customer saved two days time, twenty-five cents telephone, forty cents expressage. The casting would have cost two dollars. The Blacksmith made a Dollar and a friend too, all done by owning a "LONE STAR BRAZING HOLDER" about the simplest device imaginable but the most practical. It will hold most any odd shaped casting, circular, half-circle, zig zag, it's adjustable to any kind. This tool is so simple and does its work so well you will say when you have seen and tried one, "Now why didn't I think of this." We did though and patented it. We sell the Holder Complete with Compound for $10.00, Holder only $6.00. Compound only $4.00, charges paid when the money is remitted with the order. We will send any reliable Smith a Holder and the Compound on trial on receipt of two dollars and if it will not do what we say it will you can express it back. We have experimented with the various compounds and know that the LONE STAR (which is patented), will do the work in a way which no other will.

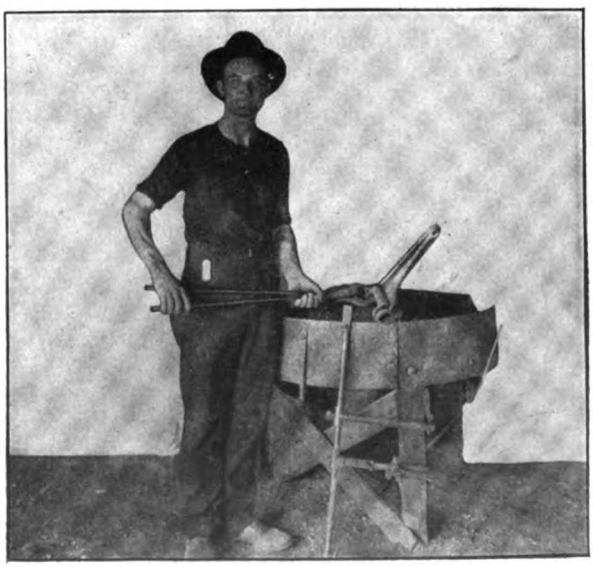
One Blacksmith writes: "Your Brazing Holder and Compound is all you claim for it. All the work I have done with it is much better than it was before it was broken. Every Blacksmith should have one." Another one says, "The outfit is more than you claim for it. Enclosed find check for $10.00." Still another comes back like this, "It's just the thing that every Smith needs and I heartily recommend both the Holder and Compound to my fellow craftsmen. I find the compound far excels anything of the kind I have ever used." We send everything prepaid on receipt of the price and you can express back to us C. O. D. if it is not just what we say.

THE LONE STAR BRAZING CO.,

MANUFACTURERS LONE STAR BRAZING HOLDER AND COMPOUND,

FORT WORTH, TEX.





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DON'T BUY GASOLINE ENGINES UNTIL YOU INVESTIGATE "THE MASTER WORKMAN," a two-cylinder gasoline, kerosene or alcohol engine, superior to any one-cylinder engine; revolutionizing power. Its weight and bulk are half that of single cylinder engines, with greater durability. Costs Less to Buy—Less to Run. Quickly, easily started. Vibration practically overcome. Cheaply mounted on any wagon. It is a combination portable, stationary or traction engine. SEND FOR CATALOGUE. THE TEMPLE PUMP CO., Mfrs., Meagher and 15th Sts., Chicago. THIS IS OUR FIFTY-THIRD YEAR.

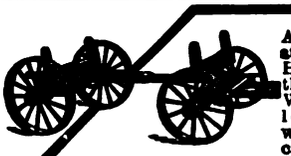
INVENTing? "HOW AND WHAT TO INVENT" and "HOW TO OBTAIN PATENTS" explained FREE.
CHESTER W. BROWN, Patent Attorney.
984 F St., Washington, D. C.

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IGNITE EVERY CHARGE.

Gas engine ignition is made sure by the APPLE AUTOMATIC SPARKER. It "gets" all possible power out of every explosion because its sparks give off heat and explode an entire charge at an instant. No switches, no belts, no batteries.

THE DAYTON ELECTRICAL MFG. CO.,
152 St. Clair St., DAYTON, OHIO.



A low wagon at a low price. Handy for the farmer. Will carry a load anywhere a horse can travel.

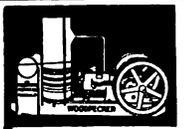
Low Down Wagons

soon earn their cost on any farm.

Steel Wheels

for farm wagons. Straight or staggered spokes. Any size wanted, any width of tire. Hubs to fit any axle. For catalogue and prices, write to

Empire Mfg. Co., Box 300, Quincy, Ill.



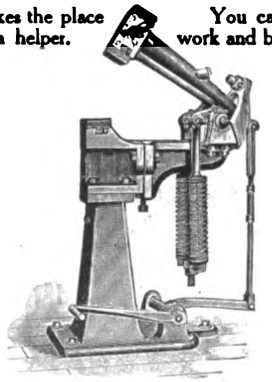
"Woodpecker" GASOLINE ENGINES

NO TROUBLE
Starting, winter or summer.
With experts or experiments.
With foundation or connections.
With poor adjustments.
With bad mixtures.
With faulty ignition.
With expensive repairs.
With unfair factory.

1½ H. P. 7 H. P. 14 H. P.
Ready to Run on Gas Mine or Alcohol.
Send for Catalogue, Prices and Free Trial Plan.
WOODPECKER, 4th St. Office, MIDDLETOWN, OHIO.

LIGHTEN YOUR LABORS
BY USING A
STANDISH FOOT-POWER HAMMER.

Takes the place of a helper. You can do more work and better work.



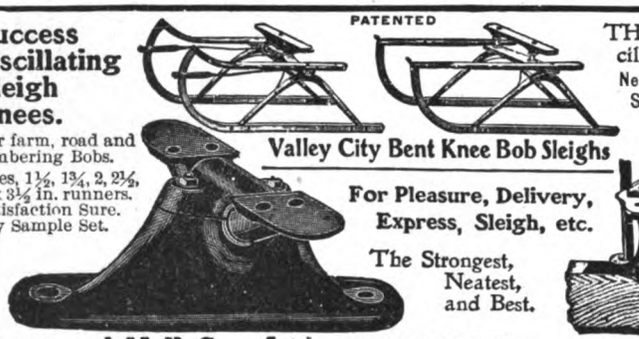
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The Standish Machine & Supply Co.,
COLUMBUS, O.

PATENTED

Success Oscillating Sleigh Knees.

For farm, road and lumbering Bobs.
Sizes, 1½, 1¾, 2, 2½, 3, x 3½ in. runners.
Satisfaction Sure.
Try Sample Set.



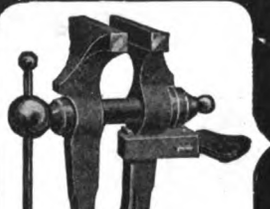
Valley City Bent Knee Bob Sleighs

For Pleasure, Delivery, Express, Sleigh, etc.

The Strongest, Neatest, and Best.

THIS is the Brown Oscillating Sleigh Knee.
Needs No Recommendation.
Satisfaction Guaranteed.
Sizes, 1¼, 1½, 1¾, 2, 2½, 3 and 3½.
Write for circular and prices on our complete line of sleigh goods.

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THREE PLAIN FACTS

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Columbian Solid-Box Vises.

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All scientific, up-to-date blacksmiths and horseshoers now recognize the Columbian Wrought Steel Solid-Box Vises as being superior to other makes for the following reasons:

They stopped to think before buying—they figured that the further a vise would open, the larger, therefore heavier, work it could hold securely.

FACT NUMBER TWO.

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They figure the depth from the top of jaw to top of box, and again found the "Columbian" LEADER.

FACT NUMBER THREE.

Then, last, they averaged up the **real** weight of the vise, not the **marked** weight—but the **actual weight in pounds,** and found the "Columbian" never under marked weight.

It may seem a little higher in price, but pound for pound it's cheaper.

We want to send you our latest catalogue, No. 16, on Vises and Anvils. It will help you get your money's worth when buying, as every vise should agree with the measurements shown therein.

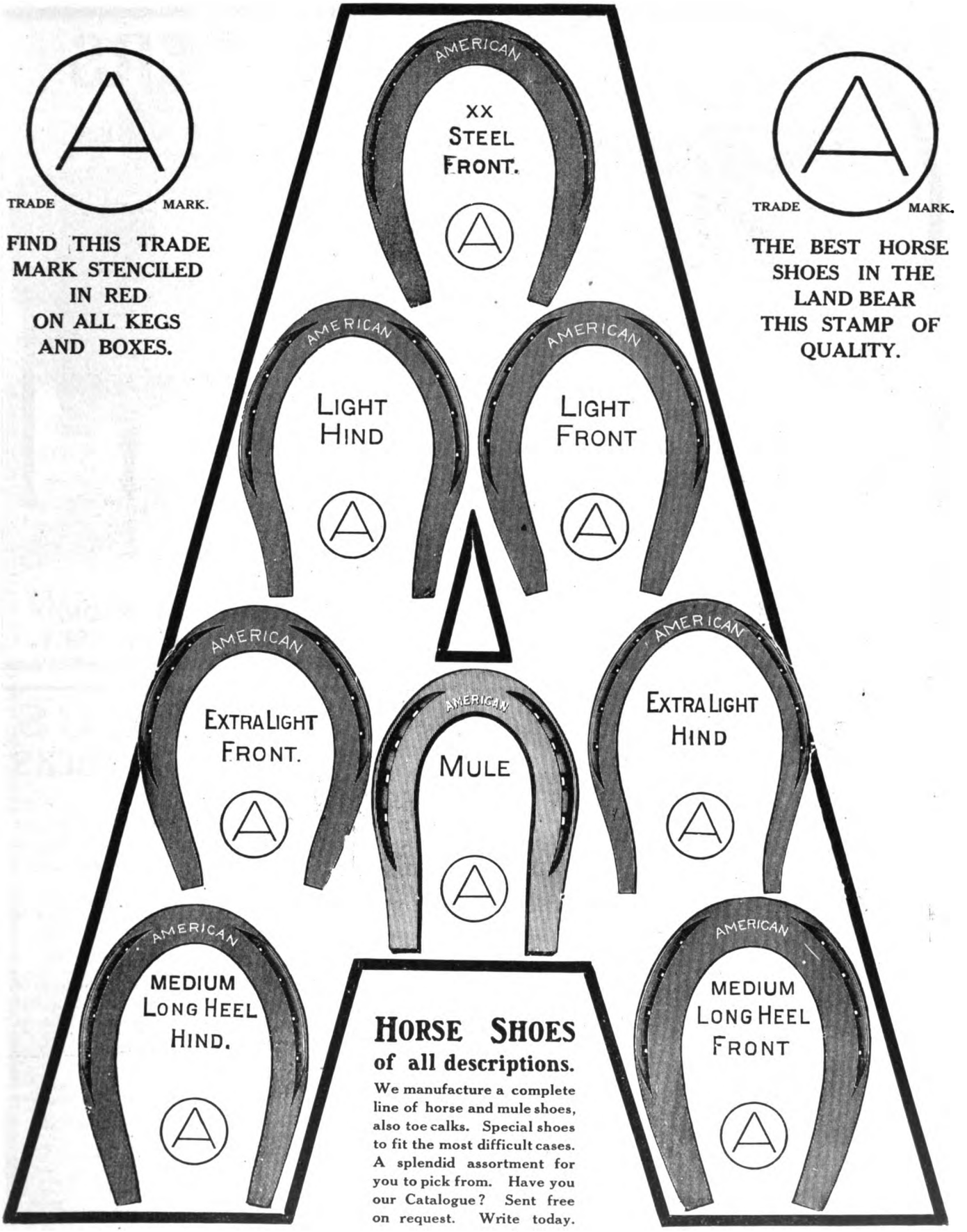
Send your name and address on a postal. We will send the catalogue free.

The Columbian Hardware Co.

168 Church St., NEW YORK. CLEVELAND, OHIO. 26 E. Lake St., CHICAGO.

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FIND THIS TRADE MARK STENCILED IN RED ON ALL KEGS AND BOXES.



THE BEST HORSE SHOES IN THE LAND BEAR THIS STAMP OF QUALITY.

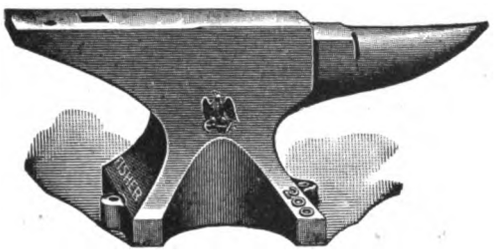
HORSE SHOES
of all descriptions.

We manufacture a complete line of horse and mule shoes, also toe calks. Special shoes to fit the most difficult cases. A splendid assortment for you to pick from. Have you our Catalogue? Sent free on request. Write today.

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"EAGLE"



ANVILS.

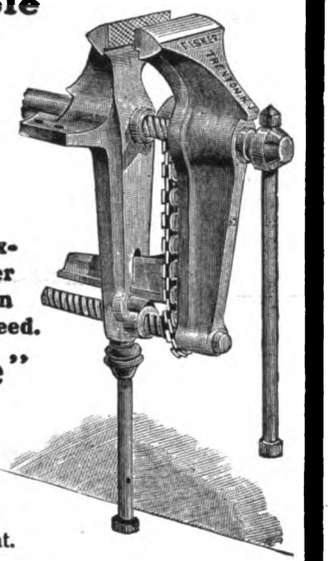
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ANVILS AND VISES OF QUALITY

"Fisher" Double Screw Parallel Leg Vise



Is sold by Reliable Dealers Everywhere. For Strength and Durability there are none better made. The "FISHER" is acknowledged the Best for Blacksmiths.

We have had over sixty years Experience in this line and offer you the most reliable Anvils on the Market. Every one Guaranteed.

WE BELONG TO NO TRUST--one blow on an "Eagle" anvil is worth two on any other anvil MADE

The Face Consists of a Single Piece of the Very Best Cast Steel Perfectly Welded and of the Hardest Temper. The Horn is made of Tough Untempered Steel and will neither Break nor Bend. All "Eagle" Anvils made with the Latest Fisher Patent Double Thick Steel on Both Edges of the Face. Made in all Shapes and Sizes up to 1300 lbs. Weight.

WRITE FOR INTERESTING CIRCULARS AND PRICE LIST. SENT FREE.

EAGLE ANVIL WORKS, TRENTON, NEW JERSEY.

SCHAU TIRE SETTER

"The Machine that does it right."



3,000 in use in the United States and Canada

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Kalamazoo, Mich.

BARCUS HORSE STOCKS



In use in all modern shoeing establishments, because they fill every shop requirement and give satisfaction everywhere.

Every one fully guaranteed. All the objectionable features of the cheap stocks eliminated.

BARCUS STOCKS

are simple, strong, solid, safe and sure to hold. No ropes or pulleys to tangle or break; no bracing to roof or floor, but furnished complete ready to bolt to the stationary posts in your shop. You can rely on

Barcus Stocks Every Time.

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MR. GEORGE BARCUS:—I wish to say that the horse rack we bought of you gives perfect satisfaction in all respects.

Yours respt., HODGINS & DOUGLASS.

ORWELL, VT., Dec. 29, 1905.

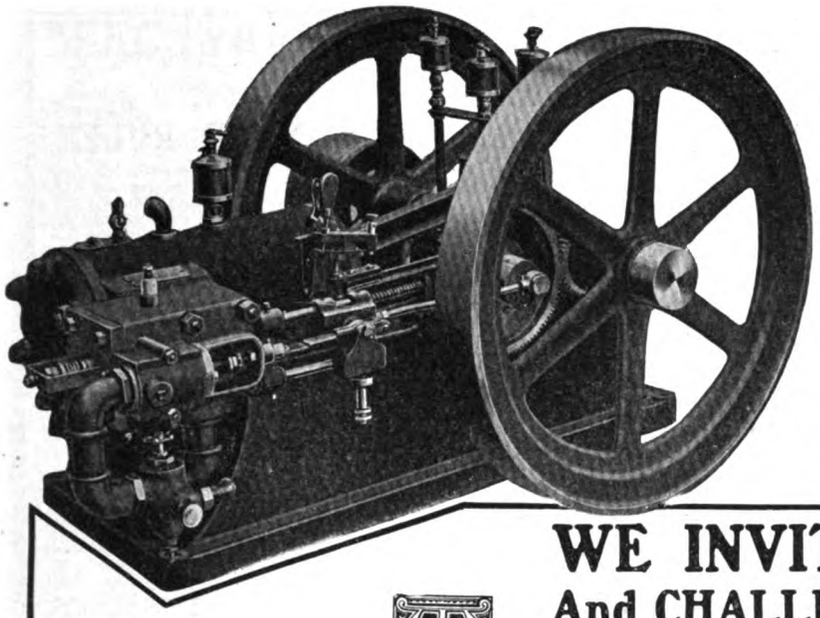
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Write for particulars.

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The WILLIAMSPORT GAS and GASOLENE ENGINE

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Always Ready to Start.

No Engineer Required.

No Increase in Insurance by their use.

WE INVITE INSPECTION And CHALLENGE COMPETITION

OUR "GIANT" 4 H. P. Engine
The Best on the Market for the user of small power. Write for details.

WILLIAMSPORT ENGINES are constructed by the most skilled workmen, and only the very best material used. We offer you an Engine of the Finest Quality, noted for its Simplicity, Durability, Ease of Operation and Beauty of Design. Our broad Guarantee covers all.

ILLUSTRATED CATALOGUE SENT FREE. Write Today.

Williamsport Gas Engine Co.

WILLIAMSPORT, PENNA.

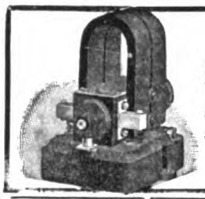
OUR GUARANTEE.

All Engines Absolutely Guaranteed free from all defects in workmanship and material. Any part found defective or faulty will be replaced by us free within one year from date of purchase.



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BURNING BRANDS
Stencil Dies, Stencils, Etc.
Geo. M. Ness, Jr.,
61 Fulton Street, N. Y.
Price List sent upon application.



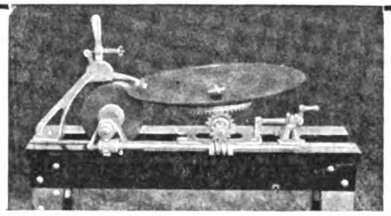


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Ignition Generators do away with EXPENSE and TROUBLE of batteries. Can be easily installed with any engine and is very simple. This Magneto regulates its own speed and furnishes constant spark at all times. INFORMATION ON REQUEST.

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THE WINNER DISC SHARPENER.

It is designed to sharpen all sizes and styles of discs. Besides your disc work you can sharpen axes, shovels, plow points, cold chisels, lathe tools, etc. CIRCULARS FREE.

Shipp & Dickerson, Renner, Texas.

CASH Always Secures BARGAINS and ALWAYS WILL

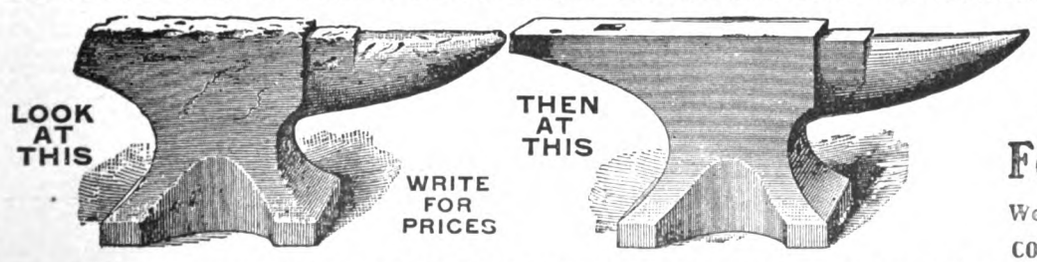
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Size of tread	Price per set for wheels with flat steel tire on and hubs bored	Price per set for wheels complete with channel and rubber tire on, and hubs bored. 36 and 40	38 and 40	40 and 44	Add to price of wheels for axles and boxes set
3/4	$6.00	$13.50	$14.00	$14.50	$1.90 L.D.
7/8	6.25	14.50	15.00	15.50	1.90 "
1	6.50	16.00	16.75	17.50	2.10 "
1 1/8	8.25	24.00	25.00	26.00	2.25 H.P.

PROMPT SHIPMENTS. Repair Wheels, $3.75.
Five sets or more, one order, you can deduct 25c. per set as freight allowance. **Write for catalogue.** We manufacture wheels with Steel or Rubber Tire on. 3-4 to 4 inch tread. Buggy Gears with wheels and shaf all ready for body, $15.50

The A. Boob Wheel Co., Cincinnati, Ohio, U. S. A.

NO MATTER HOW BADLY THEY ARE BROKEN WE CAN REPAIR THEM IN GOOD SHAPE



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COLUMBUS, OHIO.

WE ARE EXPERTS AT REPAIRING OLD WROUGHT ANVILS.

WE ALSO MANUFACTURE THE CELEBRATED ARM AND HAMMER BRAND ANVIL. **ASK YOUR DEALER FOR THEM.**

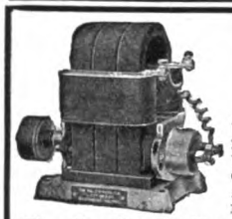
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ONLY 60 CENTS Did you ever try to shoe a horse that would not stand still? By the use of my great **Pulley Breaking Bridle** you can make the most restless horse stand as quiet as a lamb—even ugly horses, stallions, etc., completely subdued while being shod. Price, **Only 60c postpaid.** You should own one.



Will bring business to you. Send for circular telling all about it.

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"QUICK ACTION"
IGNITING DYNAMOS
Excel all others!

The only generator that cannot lose its magnetism. For either make and break or jump spark work. Also spark coils. Send for Catalogue B.

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BEST ROUTE
To the Northwest.

Chicago, Milwaukee & St. Paul Railway

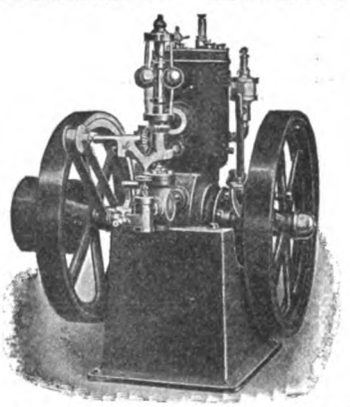
In going to St. Paul, Minneapolis or the Northwest see that your ticket west of Chicago reads via The Pioneer Limited on the Chicago, Milwaukee & St. Paul Railway—the route over which your letters go. Standard and compartment sleepers with longer, higher and wider berths. Leaves Union Station, Chicago, 6.30 p. m. daily; arrives St, Paul next morning at 7.25 and Minneapolis at 8.00 o'clock.

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Via The Overland Limited on the Chicago. Milwaukee & St. Paul Railway. Less than three days en route. No change of cars. From Union Station, Chicago, at 8.00 p. m, daily. Descriptive folder free.

F. A. MILLER,
General Passenger Agent, Chicago.

FAIRFIELD ENGINES

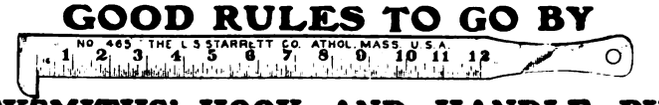


In quality of material and workmanship, simplicity of construction, ease of handling and economy of fuel, the **FAIRFIELD** has no superior. The stationary engine, illustrated, has a pedestal base, two large spoke wheels, and is provided with a ball governor that controls perfectly the amount of gas necessary to control the speed on any variation of l ad. It is light and compact and an ideal portable engine. Made either with jump or make and break spark, in 2, 3, 4½ and 6 H.P.

PRICES $95.00 TO $200.00.
Send for Catalogue.

THE FAIRFIELD MOTOR CO.
FAIRFIELD, CONN.

GOOD RULES TO GO BY



BLACKSMITHS' HOOK AND HANDLE RULES

Made from hard rolled sheet brass, one-tenth inch thick, one and one-sixteenth inch wide, with heavy gradations and figures, graduated from the end in sixteenths of an inch on one side and from the inside of the hook in sixteenths of an inch on the other, adapting them for taking correct measurements from either the outside edge of a hot piece of iron, or from the inside when held against a corner. Graduated twelve inches, have flat handles and measure over all sixteen and three-fourths inches.

Price, postpaid, $1.15. Catalog of fine Tools Free.

The L. S. STARRETT CO., ATHOL, MASS.

CLASSIFIED BUYER'S GUIDE.

To Find Address of any Firm given here, consult their advertisement. For its location in this issue, see Index on Page 22.

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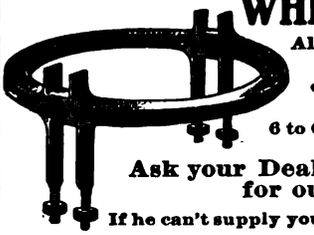


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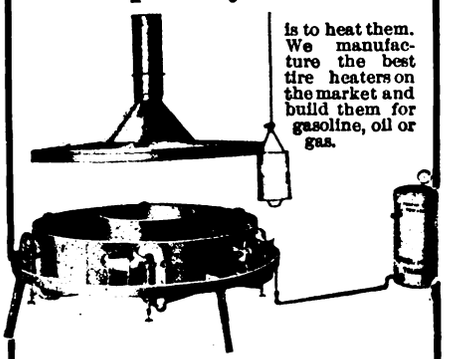
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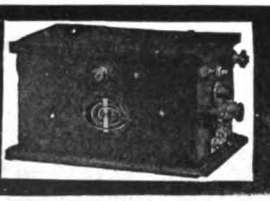
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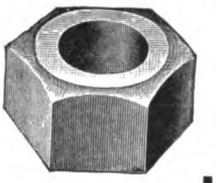
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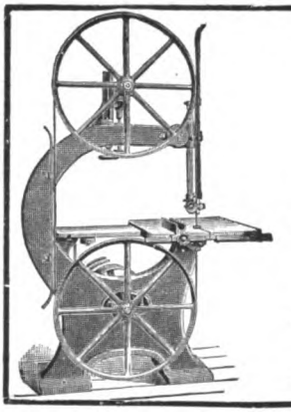
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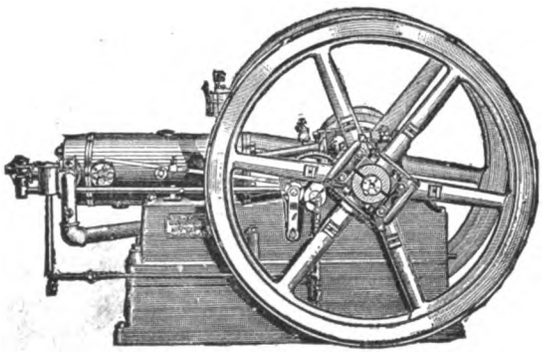
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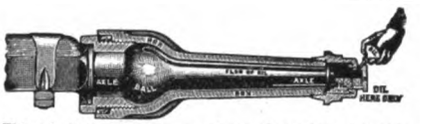
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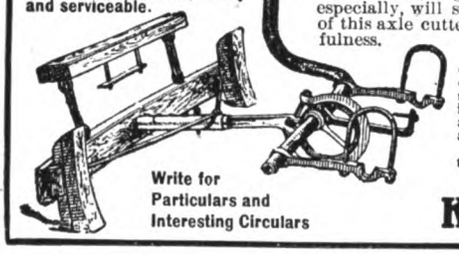


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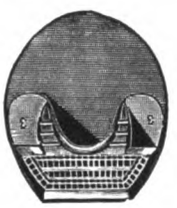
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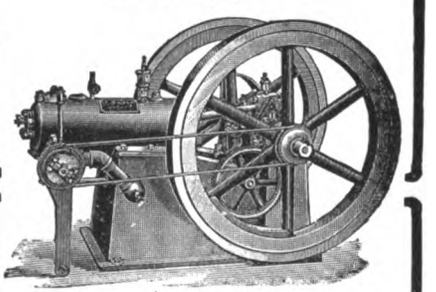


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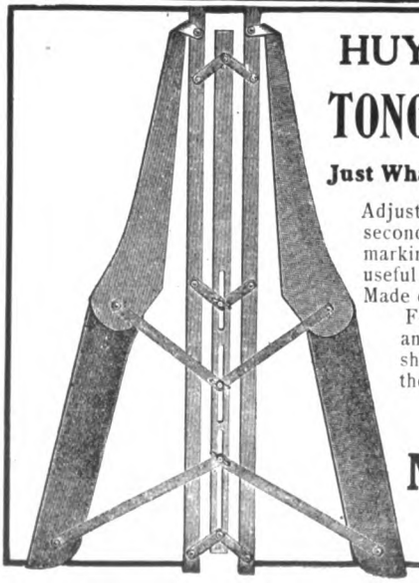
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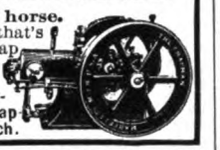
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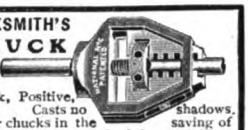
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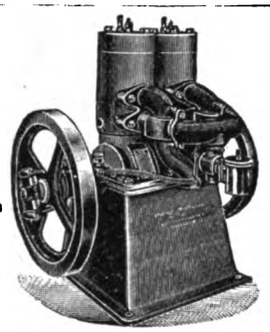
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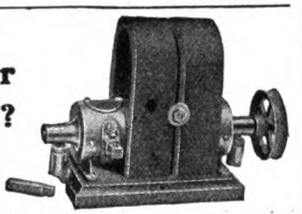
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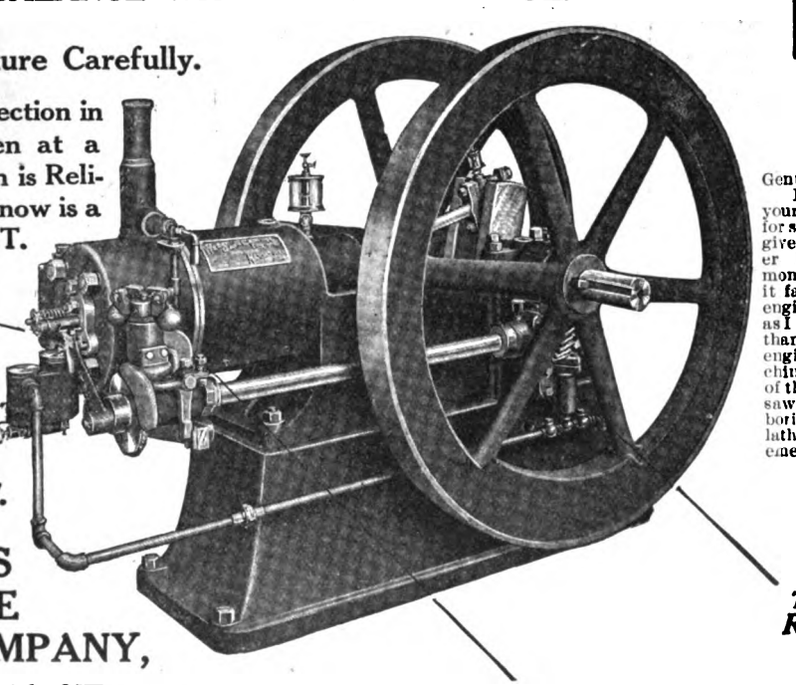
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Catalogue Free.

This Gasoline Pump ***Reduces Cost of Insurance.***

Your Fingers will turn GOVERNOR NUT to adjust SPEED, and you ***DO NOT NEED TO STOP ENGINE.***

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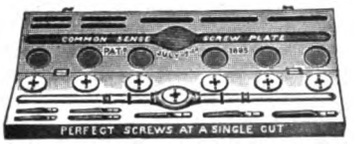


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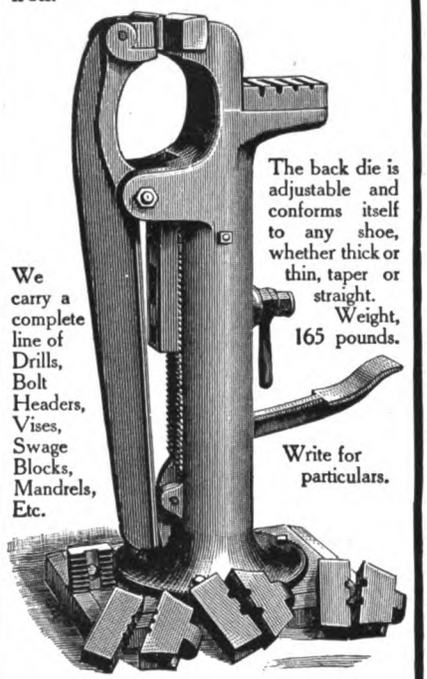
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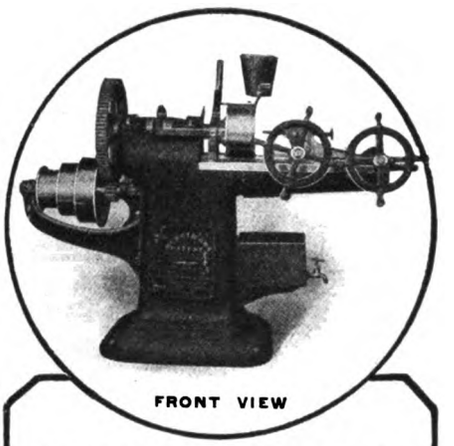
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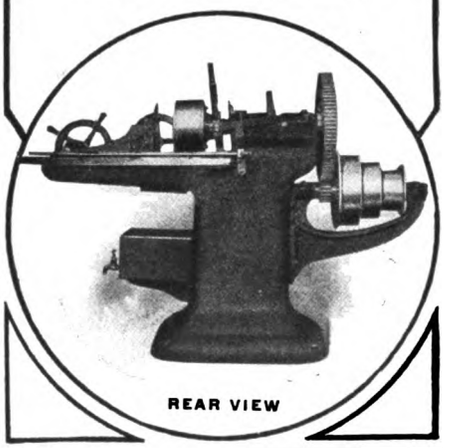


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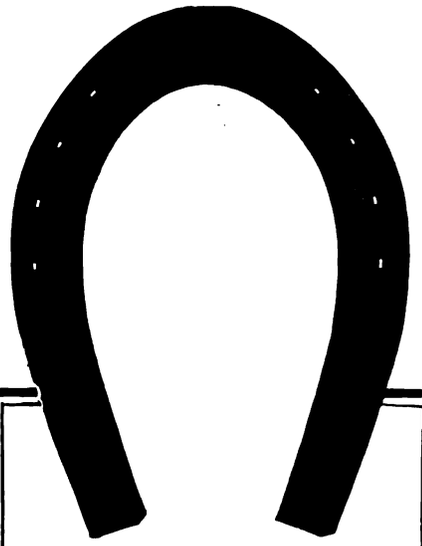
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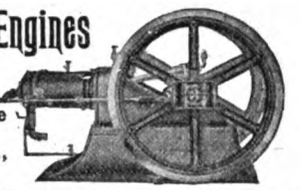
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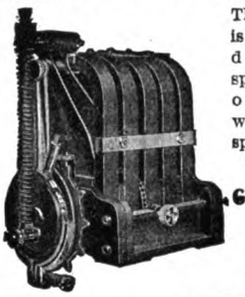
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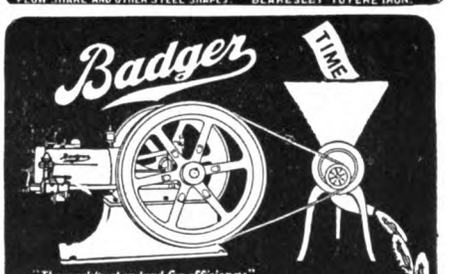


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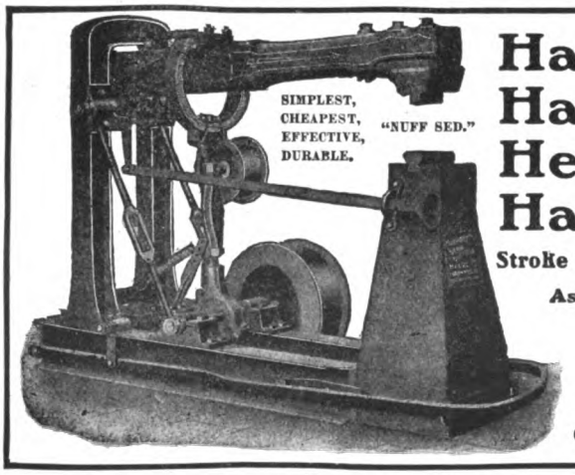




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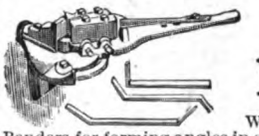
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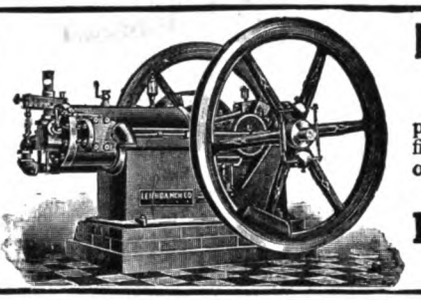
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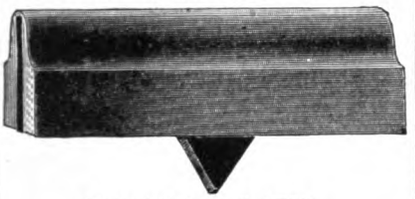
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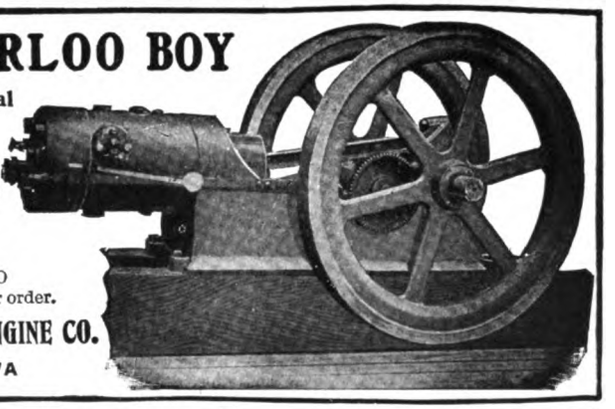


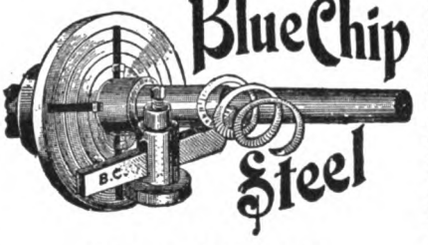
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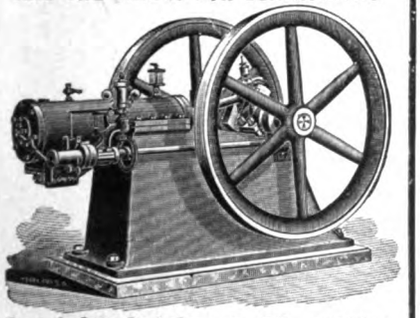
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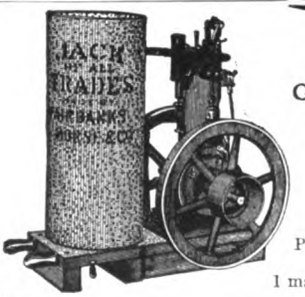
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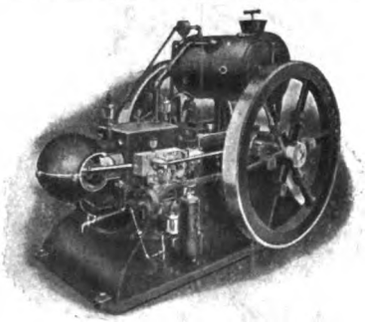
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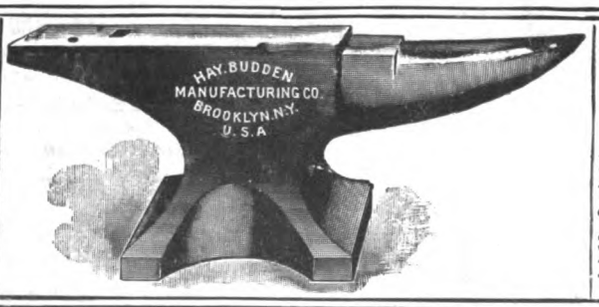
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VOLUME 6 NUMBER 2

THE AMERICAN BLACKSMITH

A Practical Journal of Blacksmithing and Wagonmaking

BUFFALO N.Y. U.S.A. NOVEMBER, 1906 $1.00 A YEAR 10c A COPY

THE STANDARD SMITHING COAL

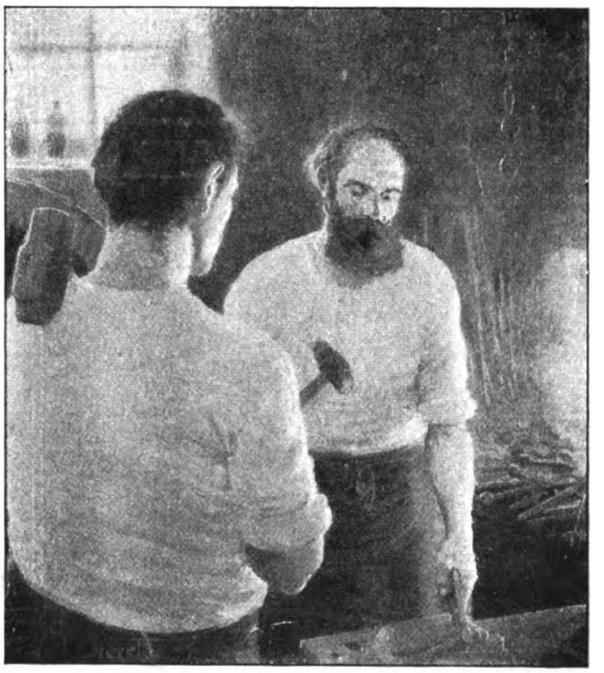
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THE CONSOLIDATION COAL

COMPANY'S GEORGE'S CREEK CUMBERLAND

NO OTHER FUEL IS CAPABLE OF DOING THE SAME AMOUNT OF WORK

COKES PROMPTLY FORMS LARGE ARCH



COST OF MANUFACTURE IS REDUCED BY ITS MAXIMUM HEAT PRODUCING POWER, ITS LOW SULPHUR AND ASH

ITS WIDE DISTRIBUTION RENDERS IT ALWAYS OBTAINABLE

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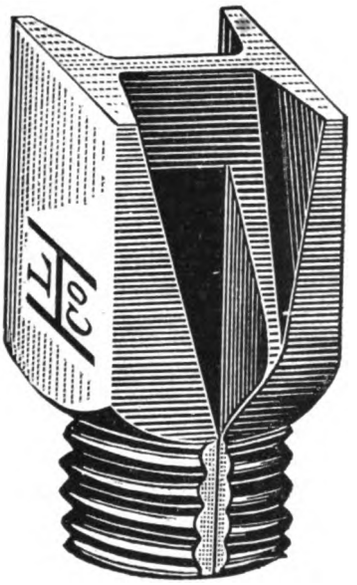
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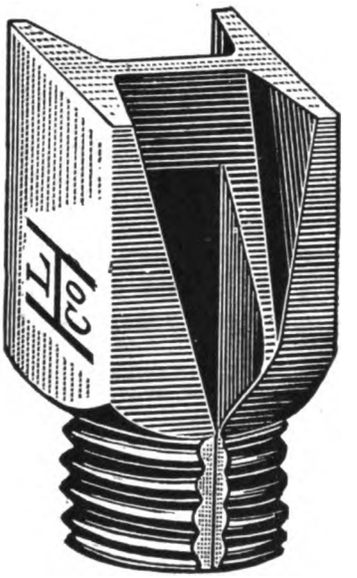
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PATENT



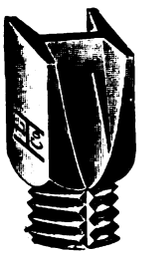
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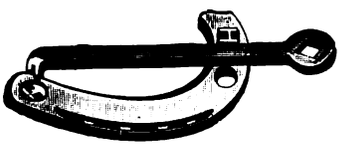
ALWAYS SHARP! NO SLIPPING OF THE HORSE.
NO INJURIES AS CAUSED BY OTHER CALKS!
GREAT SAVING OF HORSES AND HORSESHOERS.

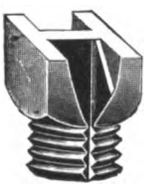
Guaranteed to Outlast Every Other Device of The Kind.



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HALF WORN!
Always Sharp!

H Calks have been in use over 25 years

Sold to Horseshoers Only

H Calks have saved more horses than all other devices of the kind together

THE ONLY INSERTIBLE HORSE SHOE CALK USED IN THE GERMAN, RUSSIAN AND AUSTRIAN ARMIES.

Write for Circulars and Price List.

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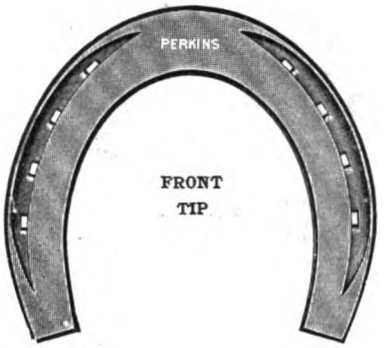
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HIND
LONG HEEL.

Look for this Trade Mark ★ The Star brand beats all others



FRONT
TIP



FRONT
LIGHT.



FRONT
TOE WEIGHT.

★PERKINS★
HORSE SHOES
AND
TOE CALKS
The **SUPERIOR** Kind

Have more points of superiority than any other make. An up-to-date shoe for up-to-date Blacksmiths.


HIND
SIDE WEIGHT.

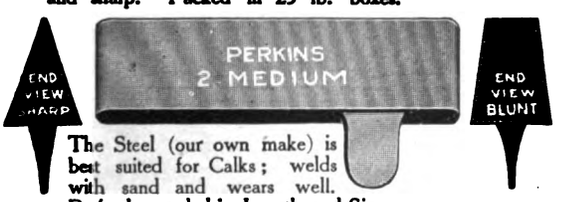
Perkins Shoes have given satisfaction wherever used. Our line is complete and every shoe guaranteed. Made in all styles and sizes. Send for sample. New Pattern Front Extra Light and Light. Free for the asking. We will gladly send

COMPLETE CATALOGUE AND SAMPLES FREE.

WRITE TODAY.

PERKINS

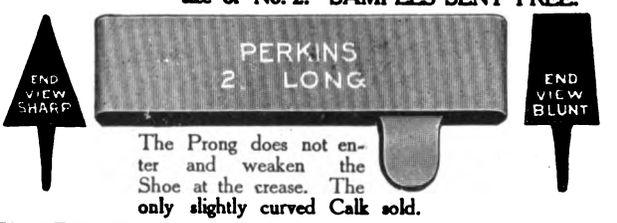
Made in Medium and Long, both blunt and sharp. Packed in 25 lb. boxes.



The Steel (our own make) is best suited for Calks; welds with sand and wears well. Perfectly graded in Length and Size.

TOE CALKS

Chisel Pointed Prong. These cuts show exact size of No. 2. SAMPLES SENT FREE.



The Prong does not enter and weaken the Shoe at the crease. The only slightly curved Calk sold.

MANUFACTURED BY

RHODE ISLAND PERKINS HORSE SHOE COMPANY

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You Can't Afford to Buy Anything

But the Best

DON'T worry, don't fret. Life is too short to be thinking of smashed-up machinery, repair lists, delays and waste of materials. Get the best in the first place. That doesn't mean the most expensive by any means. It isn't the price of our tools, it's what you get for the price that counts. Expense stops when you buy. No repairs for they're built right in the first place.

Now we frankly admit that we don't know it all—we only know how to make the best. Spend a penny, buy a post card and send for our booklet "Carriage Maker and Blacksmith Tools." Those who haven't a shop will try to borrow one when they see the money-making, modern, improved tools our booklet contains.

We mention only a few of our machines here. Send for booklet for full information.

BAND SAWS—neat, new designs, substantial construction, table adjustable to different angles up to 45° for bevel sawing; used for cutting cloth, ice, cardboard, sheet metal, brass, etc.; several sizes.

DRILLS—Post, Swing and Bench Drills, hand and power. Every wanted size. New, simple, efficient and positive; for shops and small factories, smith shops, repair shops, iron furnaces, carriage and wagon shops.

NEW TAPER HUB BORING MACHINES—centre the hub instantly and accurately; instantly adjusted for taper or straight bore.

PORTABLE FORGES—in all sizes and prices—light-running, convenient, durable and economical—real money savers.

We want to prove the merits of these and our other machines. *Ask us for our booklet "Carriage Maker and Blacksmith Tools."* It's free.



Fig. 850.
SILVER'S BASE DRILL.

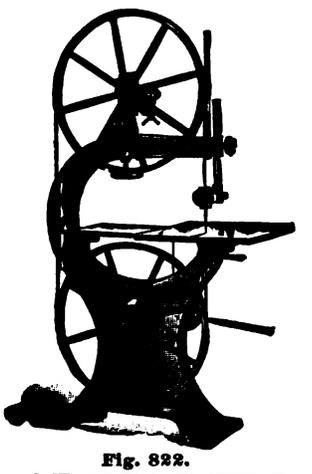


Fig. 822.
SILVER'S POWER BAND SAW.

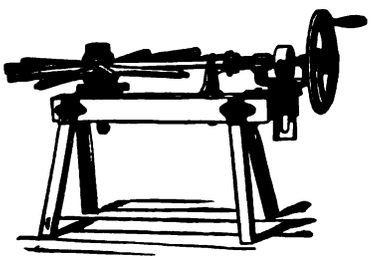
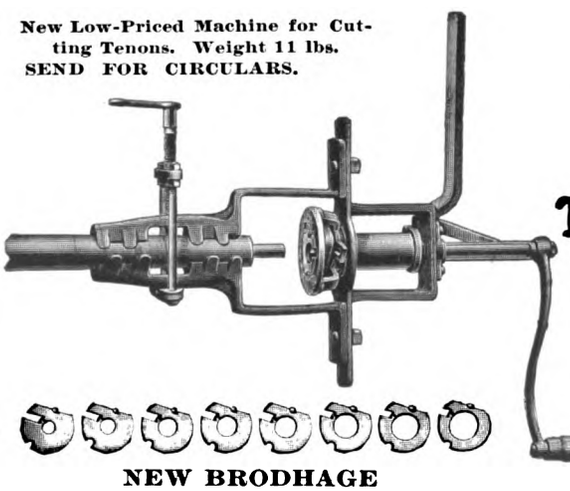


Fig. 718.
SPOKE TENON MACHINE.

New Low-Priced Machine for Cutting Tenons. Weight 11 lbs.
SEND FOR CIRCULARS.



NEW BRODHAGE SPOKE TENON MACHINE.

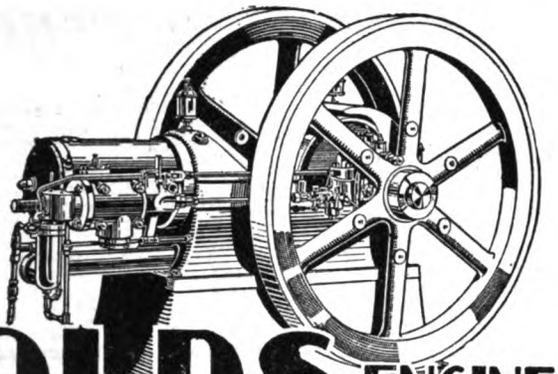
MANUFACTURED BY

The Silver Mfg. Co.

365 BROADWAY,

Salem, - Ohio.

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OLDS ENGINES

The gasoline engine best adapted to blacksmith work is the Olds Engine. It is simple—requires very little attention—will not get out of order.

Repairs Practically Cost Nothing

It gives an economical power, without bother, and can be depended upon any time it is wanted.

Our catalog tells why this is so—please send for it and hear our story.

We make engines from 2 to 1200 h. p. The one you want at the price you want to pay.

OLDS GAS POWER CO.,

975 Chestnut St. LANSING, Mich.

A HIGH GRADE ENGINE FREE

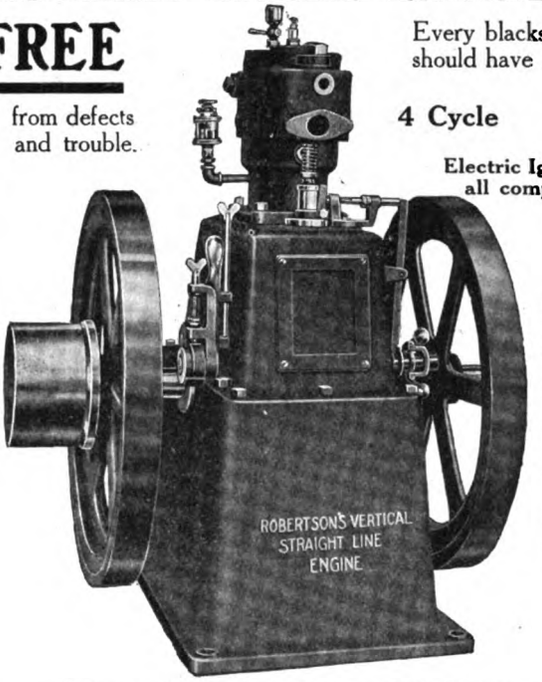
Every blacksmith should have one.

from defects and trouble.

4 Cycle

Electric Ignitor all complete.

3 1-2 to 50 H. P. Vertical and Horizontal.



Our engines are guaranteed as represented or no sale.

Write for our Special $50.00 cash proposition today.

THE ROBERTSON MFG. CO.,

BUFFALO, N. Y.



The Buffalo No. 200 Blower attached to this forge is covered by a Five Year Guarantee against repairs due to wear. The only forge sold under a Five Year Guarantee.

Patent Applied For

Buffalo Portable Rivet Forge No. 625

BUFFALO NO. 625 PORTABLE RIVET FORGE

The Gears, Fan-Case, Bowl, Standard and Legs of this Forge are detachable and can be assembled in two minutes. A deep bowl and strong blast supplied by the Buffalo No. 200 Blower fits this Forge especially for outdoor work. Made of heavy sheet steel, it is practically indestructible. The deep fire bowl gives large capacity and adapts it to general repair work as well. Light in weight, it can easily be carried about by one man. For work on tanks, steel buildings, boilers, mines, railroads, etc., this portable forge is unsurpassed.

SOLD BY BEST DEALERS THROUGHOUT ENTIRE WORLD.

Send for Illustrated Catalog.

Buffalo Forge Company
Buffalo, N.Y.

Canadian Buffalo Forge Co., Ltd., Montreal.

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PIKE'S SOLUS VETERINARY MEDICINES.

PIKE'S SOLUS HOOF OIL.

For dry, contracted and pinched feet. Will soften the dryest hoof in a few days.

PIKE'S SOLUS THRUSH CURE.

Guaranteed to cure any case of Thrush or money refunded.

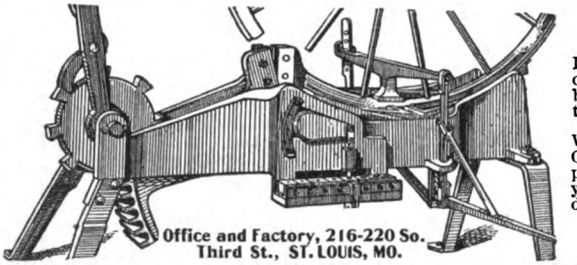
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HENRY L. PIKE,
146 BEVERLY ST.,
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Nearly 3000 have been sold, none of them broken up or abandoned, but all in use today. This proves that ours is the only successful Cold Tire Setter in the world.



Office and Factory, 216-220 So. Third St., ST. LOUIS, MO.

Don't be deceived into buying anything else.

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GEAR EXCELLENCE!



The Best Design Material Workmanship

O. M. Milk Wagon Gear No. 251

We will exhibit both in New York and Philadelphia, and as in other years we will lead.

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SEND YOUR NAME TODAY!

SCHUBERT BROS. GEAR CO., ONEIDA, N. Y.

TRENTON

Anvils speak for themselves. There are none better made. Don't buy an anvil until your dealer has shown you the

TRENTON

Buffalo Punches Shears and Cutters

BUILT OF ARMOR PLATE

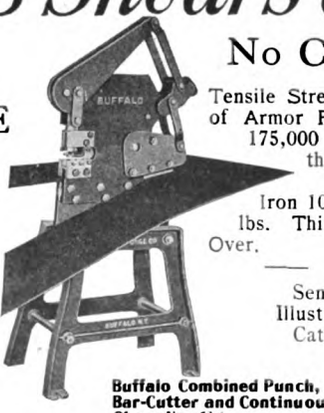


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SHEARS ANY LENGTH WITHOUT BINDING OR CRIMPING.

Thirty-five different styles, all Capacities. Hand and Power.

Sold by best dealers throughout entire world.

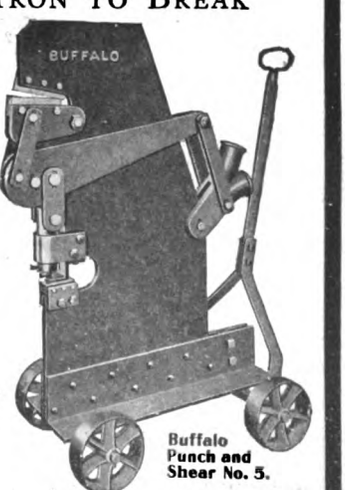


Buffalo Combined Punch, Bar-Cutter and Continuous Shear No. 4½.

NO CAST IRON TO BREAK

Tensile Strength of Armor Plate 175,000 lbs., that of Cast Iron 10,000 lbs. Think it Over.

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Buffalo Forge Company

THE CANADIAN BUFFALO FORGE CO., MONTREAL. *Buffalo, N.Y.*

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THE BEST BLADES FOR YOUR WORK

are "EUREKA" for hand frame and "X. L." for power machines.

We have been making hack saw blades for more than 20 years AND KNOW. Write for catalogue AB and Price List.



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PROMPT SHIPMENT FOR CASH

F. F. BOWN MFG. HOUSE

1216 West Carson Street
PITTSBURG, PA.

OAK WAGON SILLS—Surfaced on all four sides



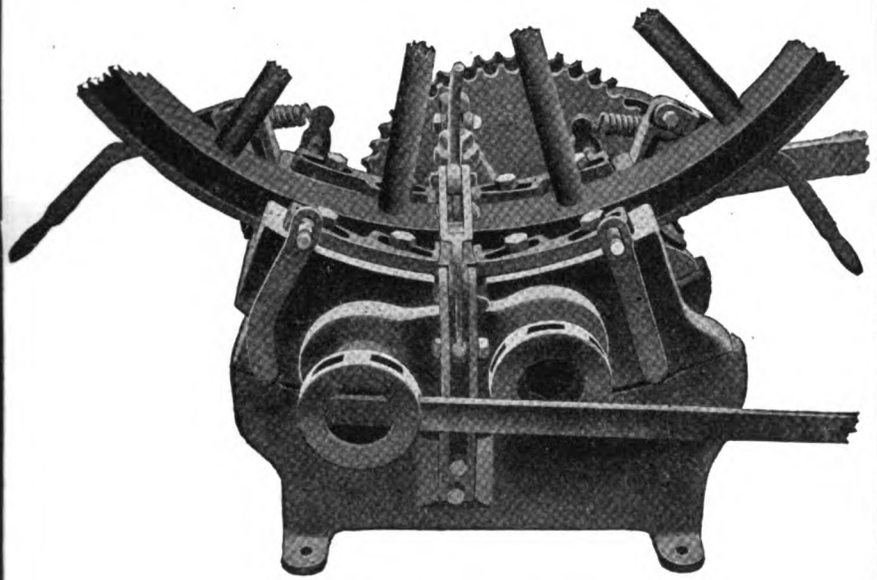
1⅜ in. x 3 in. — 8 cents per lineal foot.
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1⅜ in. x 4 in. — 10 " " "

All Sizes in Two Foot Lengths up to Sixteen Feet

ARE YOU AWAKE

to the fact that your customers can be organized into a body of ardent advertisers for you? THE BROOKS WILL DO IT? Every customer concedes its superior work over all others and knows that it cannot be duplicated in any other way. They are so well pleased that they talk it to their neighbors and they become your customers and advertisers, thus it forms a growing chain of advertisers for your business. Nothing can be added to your shop that will increase your business as the Brooks will. Boom your business by getting one now. It is the acknowledged superior of every other make. It is the only one that has stood the Government tests and in use in the United States Government shops.

The Brooks Cold Tire Setter



Adopted by the United States Government
Sets tires 4½ inches and all smaller sizes

once in your shop, eliminates all chances for a miscalculation and dissatisfied customers. They all become your advertisers and talk your machine.

The Brooks is the most durable and most powerful machine ever offered to the trade. It has an automatic grip key tightening device, which no other machine has. It is mechanically constructed in every detail. It is the result of the long experience of the oldest builders of edge grip cold tire setters. Our machines far excel anything ever built in the cold tire setter line. No other machine does its work so well, so easily and so quickly and is as durable. Our descriptive booklet, special terms and a handy vest pocket memorandum book sent free for the asking.

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121 North Water St. WICHTA, KANSAS.

THE BLACKSMITH THAT BUYS THE

MONARCH DISC SHARPENER

GETS THE BUSINESS.

Don't let your Neighbor Do it First



See the Chips fly and watch the Dollars roll in.

ORDER NOW and Cinch the Trade in your Section.

The Wonderful Work that this Machine does can hardly be believed—but seeing is believing. . . . . .

REMEMBER it was designed by a practical smith and is made by the oldest and largest Iron Works in the West.

INTERESTING CIRCULARS SENT FREE. WRITE TO

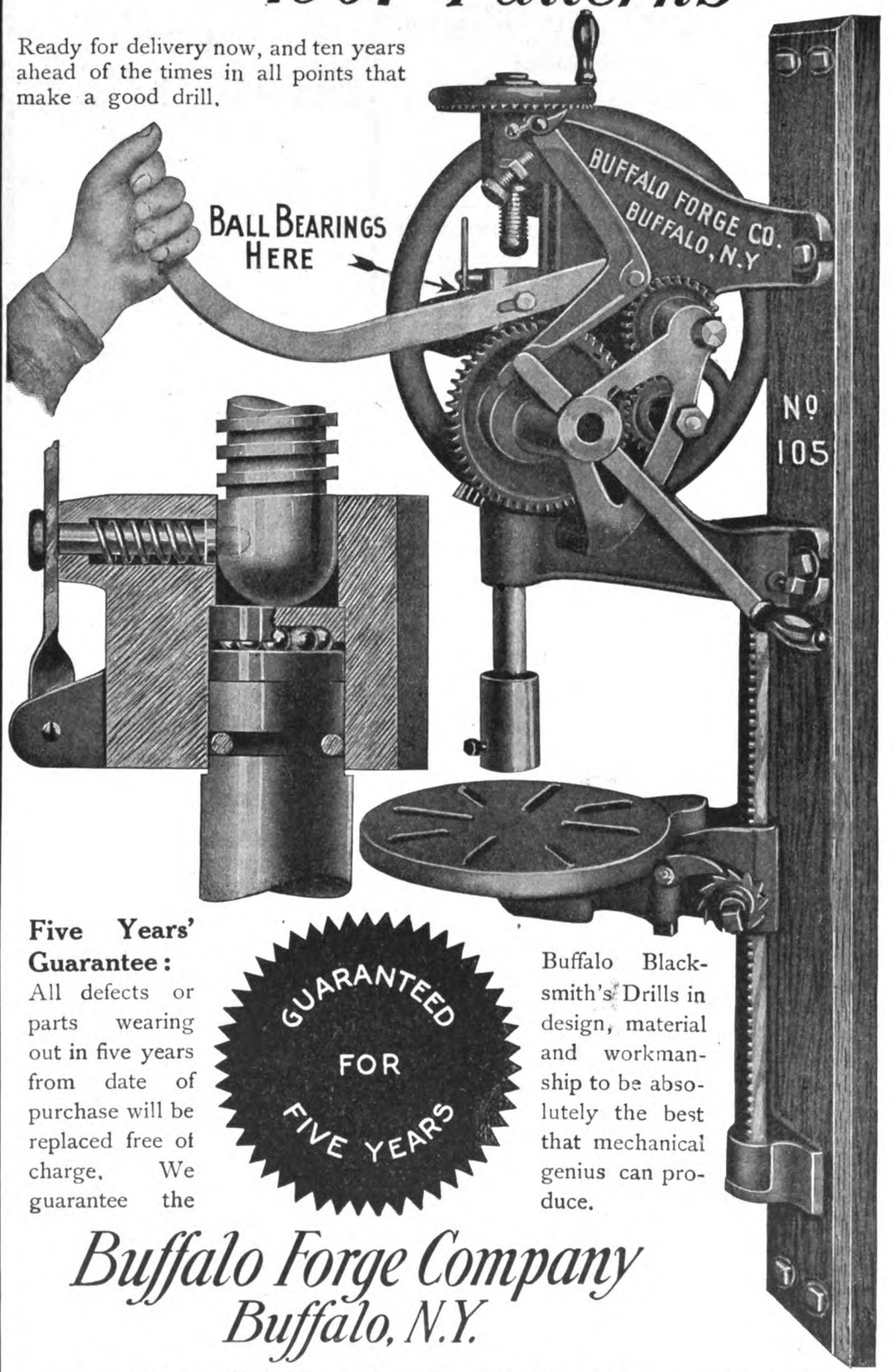
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1907 Patterns

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BUFFALO 1907 DRILLS.

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5 Prices
Send for Photographs

Designs are
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Strong
Simple
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Original
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Features:
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No Lock-Nuts to take the thrust – Buffalo 1907 Drills are free from these bygones.
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Bearings ***bored*** and ***reamed*** in solid metal, no liners used.

Five Years' Guarantee: All defects or parts wearing out in five years from date of purchase will be replaced free of charge. We guarantee the Buffalo Blacksmith's Drills in design, material and workmanship to be absolutely the best that mechanical genius can produce.

GUARANTEED FOR FIVE YEARS

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Buffalo Ball Bearing Drill No. 105.

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Reinforced Diamond Welds



USED ON ALL OUR POLES AND SHAFTS.

THE PIONEER POLE & SHAFT Co.

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SEND FOR POLE AND SHAFT CATALOGUE AND PRICES.

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ECCLES BALL-BEARING COUPLINGS

WITH LEATHER BUSHINGS

We make these Couplings in Buggy and Surrey sizes, and with Extension for Welding on an Axle Step.

Note how the Spring is fastened at the front end by a pivot, so that it can be TURNED FORWARD out of the way, while clipping the Coupling on the Axle.



We make Wide Center Clips, both 5-16 and 3-8, and Square Clips for use with these Couplings, also Solid Forged Step Shank Clips.

PATENTED NOV. 25, 1902.

The ease with which our Couplings are put on will save you money.

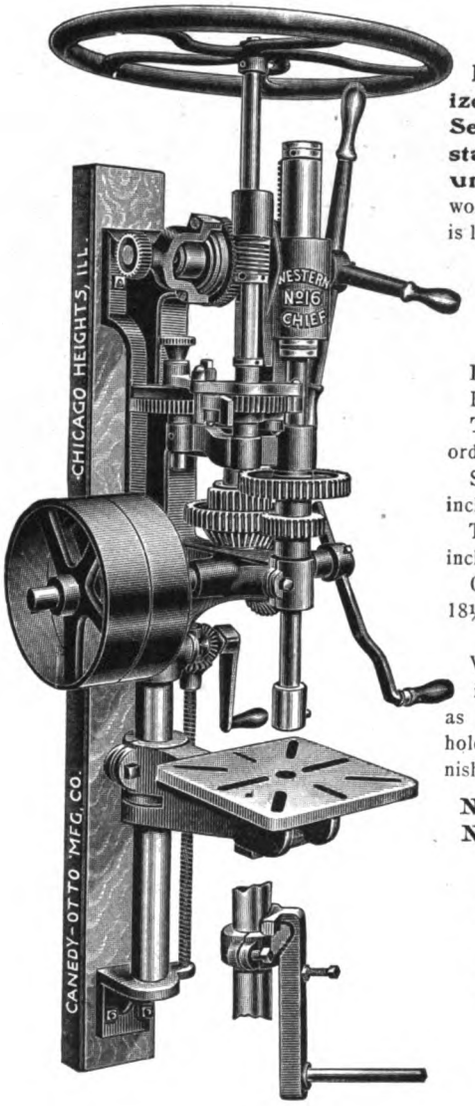
WE ARE MANUFACTURERS OF A FULL LINE OF

CARRIAGE AND WAGON FORGINGS

RICHARD ECCLES CO. ***Auburn, N. Y.***

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No. 16 = Western Chief Drills = No. 17



DESCRIPTION

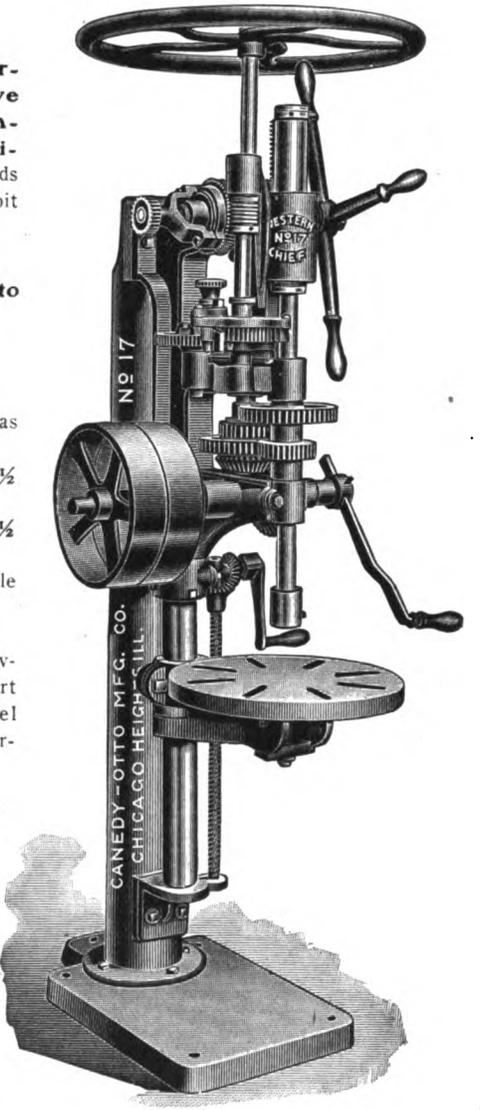
Hand Lever Feed, also Horizontal, Gear Driven Positive Self Feed, changeable instantly to fast, slow or medium speed as desired. These feeds work independent of each other and bit is lifted quickly.

Cut Gears.
Raise and lower device to table

Drills to center of 24-inch circle.
Bores from 0 to 1½ inch.
Takes Bits ½ or 41-64 Shank as ordered.
Spindle has up and down run of 8½ inches.
Table has up and down run of 15½ inches.
Greatest distance from table to spindle 18½ inches.

Wheel rims can be drilled by removing table and using the forked support as a wheel holder. A special wheel holder attachment as illustrated is furnished when desired.

No. 16, Weight 360 pounds
No. 17, Weight 560 pounds





Royal Blower

"The Successful Blower"

Gear case is oil-tight and dust-proof. Gears run in a continuous bath of oil. No spiral gears, worm gears or ball-bearings. Crank turns forward or backward. Fan 12 inches. Weight 135 pounds.

Fire pot is 8x9 1-2x4 inches inside. Needs no Clay.

Some

"Popular Tools"

Made by

CANEDY - OTTO MFG. COMPANY,

Chicago Heights, Ill.

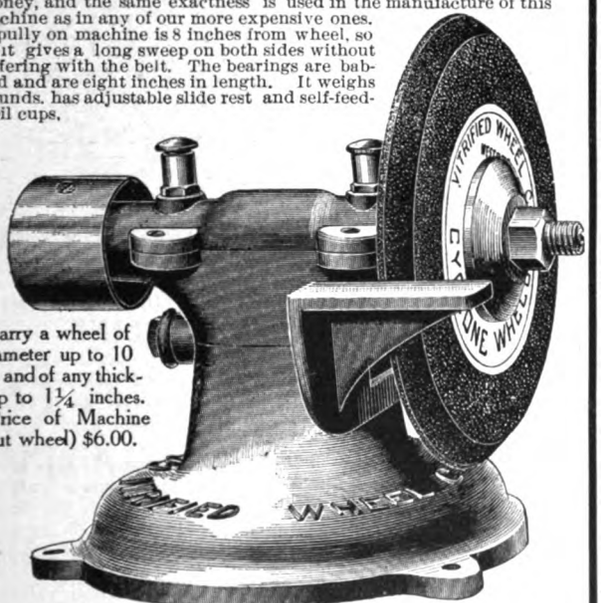
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First-Class Dealers
EVERYWHERE.

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THE HANDY GRINDER

We consider this machine can well be called the Handy Grinder, as it will carry a wheel suitable for any kind of light grinding, takes up but little room, and is inexpensive. This machine weighs nearly twice as much as any grinder on the market for the same money, and the same exactness is used in the manufacture of this machine as in any of our more expensive ones. The pully on machine is 8 inches from wheel, so that it gives a long sweep on both sides without interfering with the belt. The bearings are babbitted and are eight inches in length. It weighs 34 pounds. has adjustable slide rest and self-feeding oil cups.



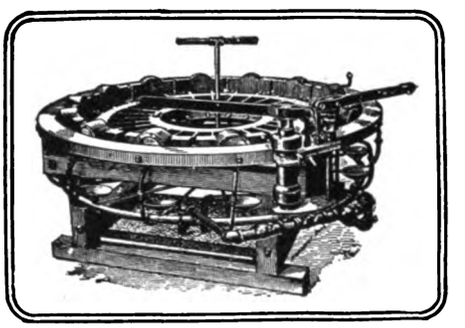
Will carry a wheel of any diameter up to 10 inches, and of any thickness up to 1¼ inches. Net Price of Machine (without wheel) $6.00.

Write for descriptive circulars. Sent free.

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Is a **Round Machine** for tiring **Round Wheels,** and compresses the tire at all points—not all in one spot—and the compression is so slight at any particular point that tire bolts do not have to be removed when resetting an old tire, neither are holes closed so bolts are tight in tire. Wheel is made compact and joints tight.

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The West Tire Setter Company

ROCHESTER, N. Y.

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Will do your work

EASILY
QUICKLY
and
GOOD

because it is the

Simplest
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Strongest Built.

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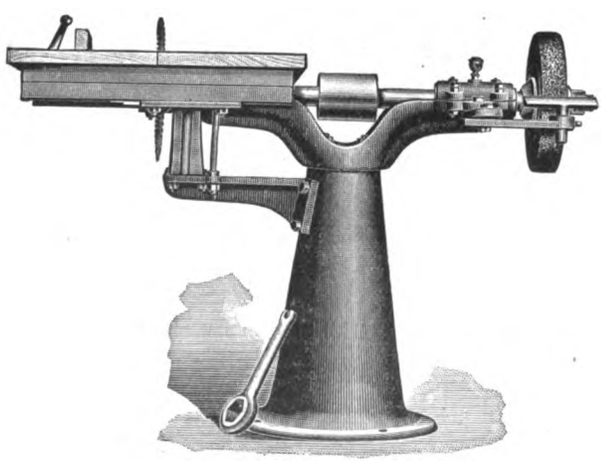
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Little Giant

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Punch and Shear.

The Most Powerful Lever Punch and Shear Made.

5 Punches and Dies with Each Machine.

MADE IN THREE SIZES.

No. 1—Will punch 5/8-inch hole in 1/2-inch iron. Cuts iron 5/8-inch thick and 1-inch round. Weight, 515 lbs.

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No. 3—Will punch 3/8-inch hole in 3/8-inch iron. Cuts iron 3/8-inch thick and 3/4-inch round. Weight, 280 lbs.

Only ONE operation of the Lever does the work. No changing required.

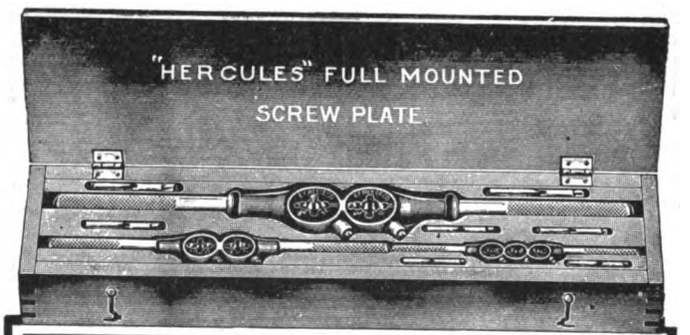
Note the improved Stripper and Hold-down. This machine is made for the blacksmith shop, and we DO claim that it is decidedly the best on the market for that place.



For Sale by your Jobber. If not, Write Us. Send for Circular.

Little Giant Punch & Shear Co., Sparta, Ill.

REECE
HERCULES FULL MOUNTED
SCREW PLATES



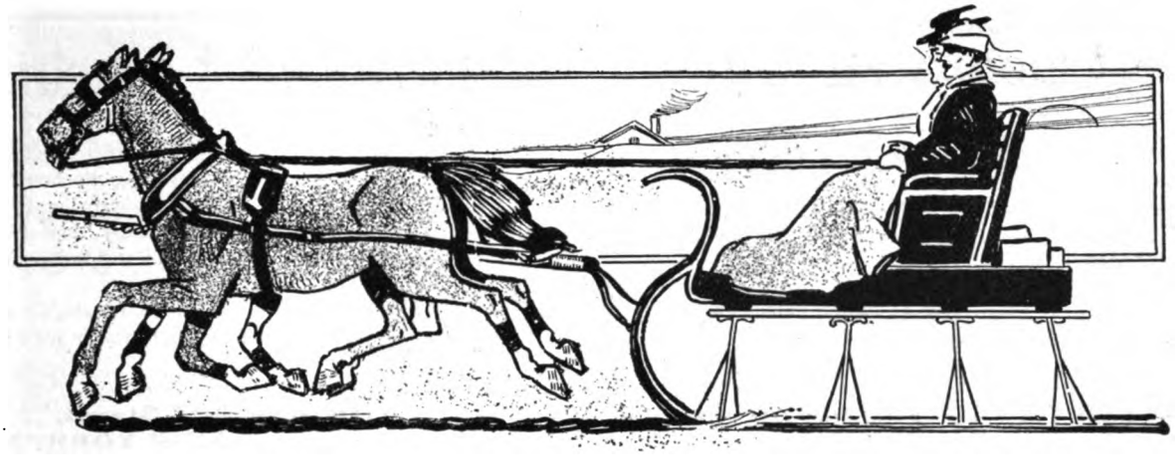
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retains its natural action and is never restrained by fear from putting forth its best efforts.

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Neverslip Calks are hard, strong, and will wear longer than all other Calks.

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Sold only with red tips—remember the RED TIPS.

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The Neverslip Manufacturing Company

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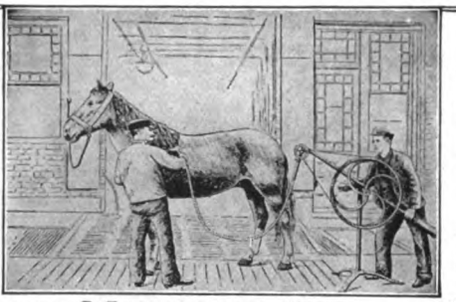
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The Guarantee we give you with our Machine is as good as a U. S. Gold Bond.

We are so far in advance of other Machines in improvements **that we really have no competitors.** Gillette Machines give satisfaction in every way.

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The Gillette Machines were the first Horse-Clipping and Grooming Machines made in any part of the world; many imitations have been put on the market, but none have ever reached our high standard.

Send for our 1907 Catalogue and read about our New Patent Chain and Grooming Brush.

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Your Hack Saw Troubles

will come to an end if you get the old reliable Universal brand. Send for our free booklet with hints on the use of the hack saw.



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Now made of high carbon steel.



Guaranteed to be stronger and more rigid than solid steel axles. We make both. Write us

National Tubular Axle Co., EMIGSVILLE, PA.



OLIO, MISS., Sept. 22, 1906.

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Enclosed find check for payment in full for tire setter.
I have tested it thoroughly and find it to be all that you claim for it. It is so simple and easy to work and does its work so thoroughly.
Yours truly,
J. A. Talbert.

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Electric Forge Blowers Excel All Others

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A Good Blower That Blows Everybody Good.

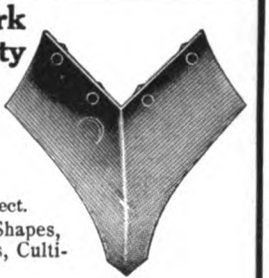


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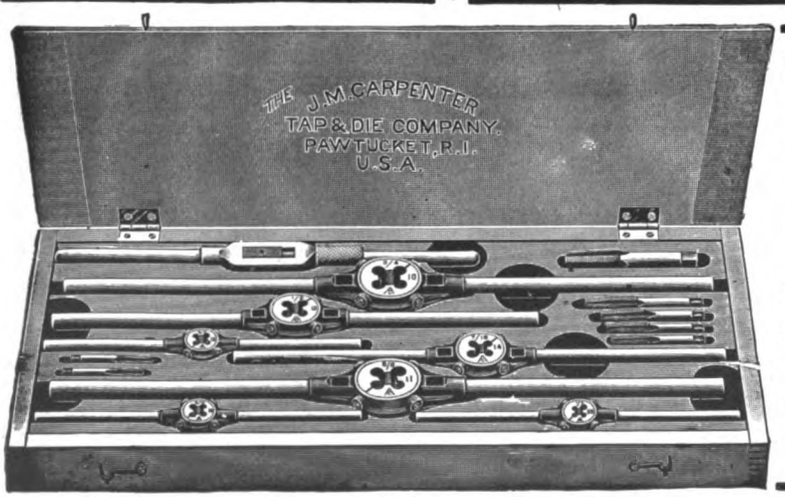


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$6.75 Is the Price of This
Genuine Stewart No. 1 Horse Clipping Machine



This is unquestionably the most perfect clipping machine ever manufactured. The gears are all cut directly from the solid steel bar, and are thoroughly enclosed in a metal case where they run constantly in an oil bath. It does away practically altogether with wear and friction. Every part of the driving mechanism is

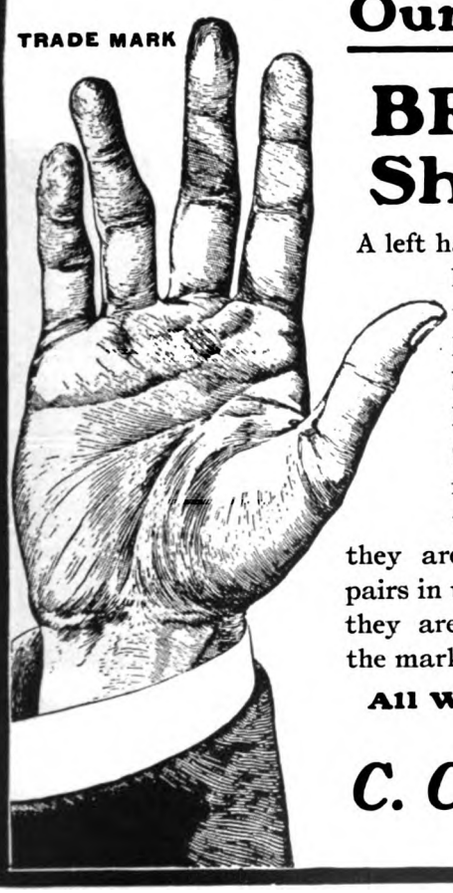
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It has 6 feet of new style light easy running flexible shaft and is fitted with the highest grade Stewart one nut balance pressure clipping knife. It runs easiest of all clipping machines and clips very fast.

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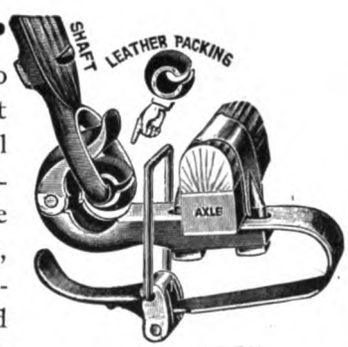
Chicago Flexible Shaft Co.,
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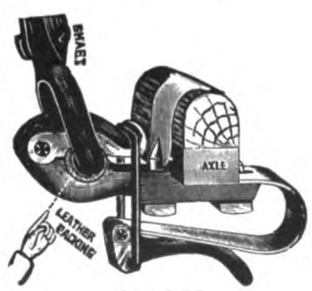
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Capewell Nails always give entire satisfaction.

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I have used Capewell Nails for about seven years, four years of which I was in the **flint hills of Missouri,** and they have always given entire satisfaction.

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THERE ARE NO OUTS

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ONLY CALKS WITH REAL SHOULDERS AND REAL STEEL CENTERS

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Sold to Horseshoers only.

Send us the names and addresses of your customers and we will mail each an attractive booklet, bearing your name and busines in a prominent position.

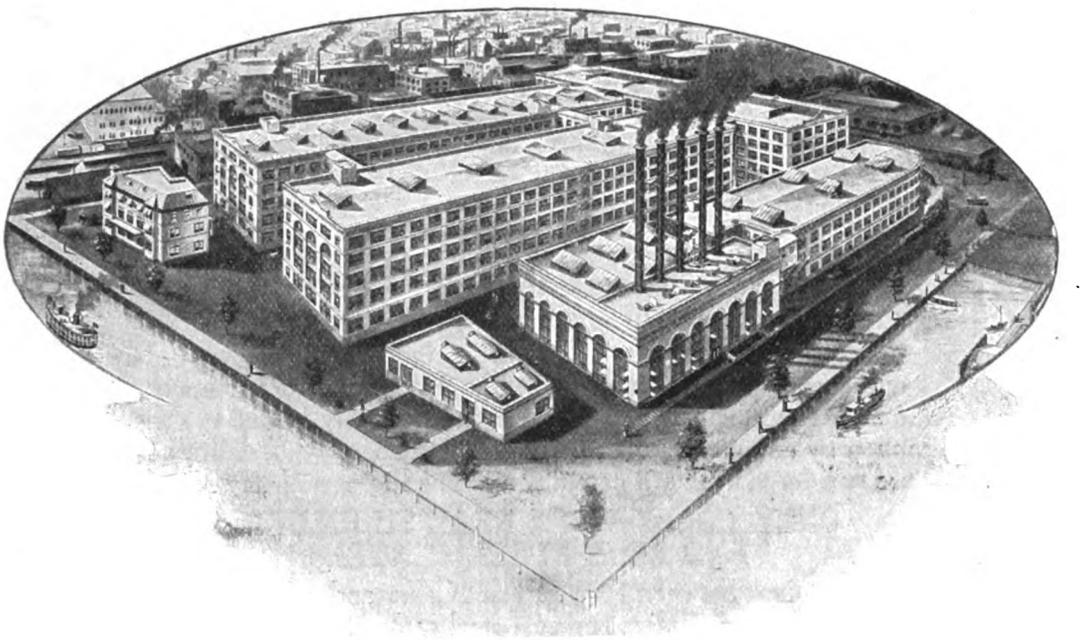



Guaranteed to wear longest

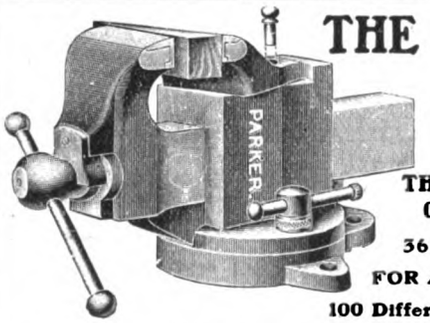
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MORGAN & WRIGHT

are in their new factory at Detroit



busy making <u>good</u> pads (and lots of them) for shoers who like that kind.



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THE MOST RELIABLE ON THE MARKET

36 Different Styles, FOR ALL PURPOSES.

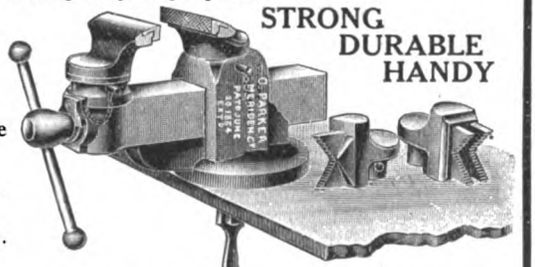
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Our complete illustrated catalogue is free. Write today for price list also.

A tool of many uses. Both round and pipe jaws interchangeable. Weight, 76 lbs.

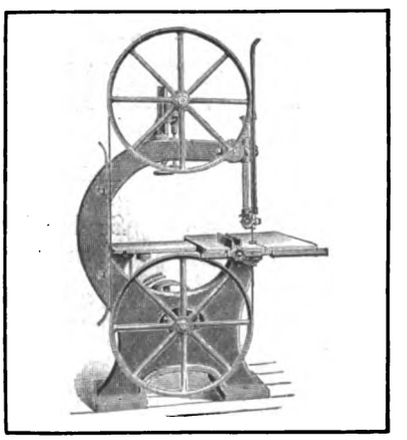
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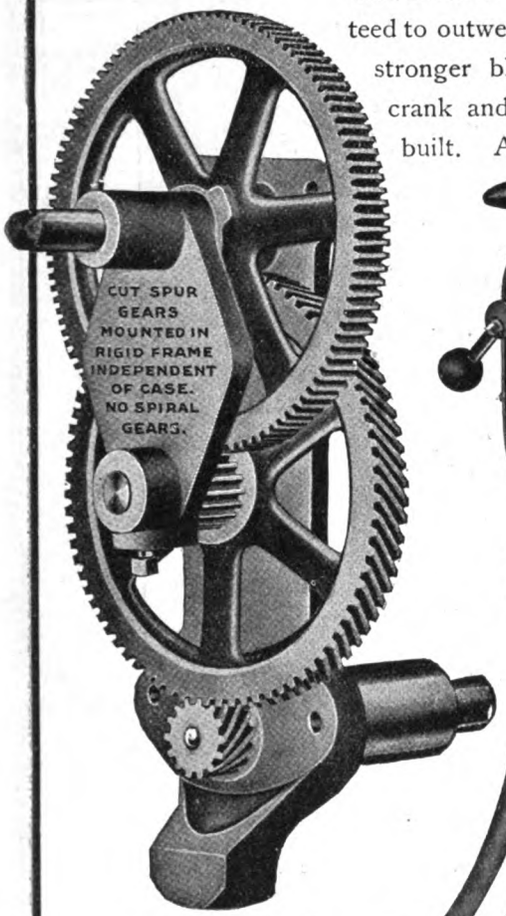
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Guaranteed for Five Years

GUARANTEED FOR FIVE YEARS

The Buffalo Geared Hand Blower No. 200 is guaranteed to outwear any other on the market, to produce a stronger blast with the same number of turns of crank and with less effort than any other blower built. Any parts wearing out in five years will be replaced free of charge and no questions asked.



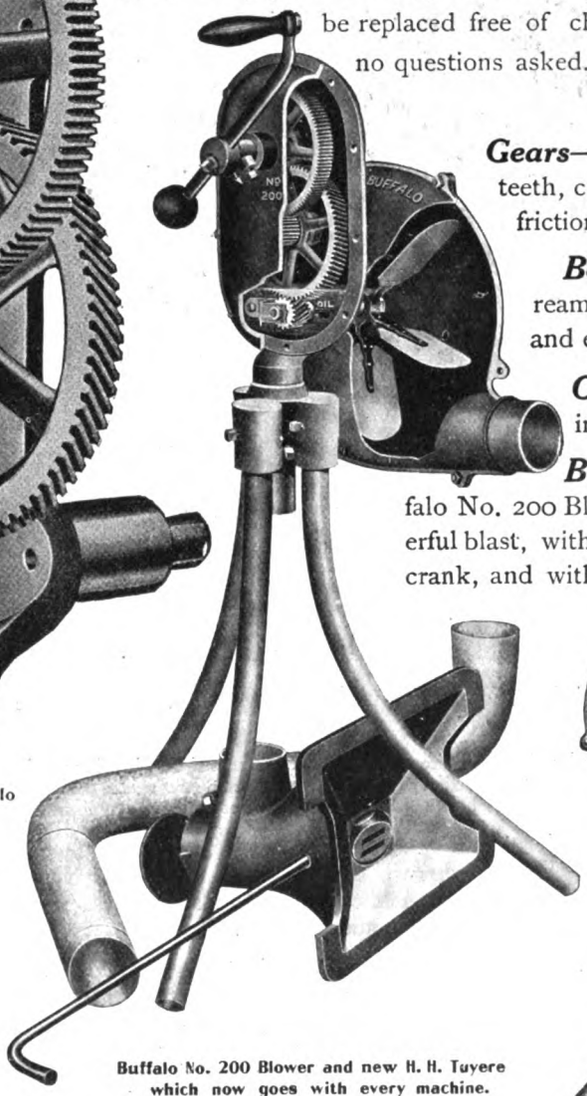
Gearing Used on Buffalo Nos. 200 and 201 Blowers.

Gears—Heavy, with large, strong, machine cut teeth, cut spur and helical variety which reduces friction and increases efficiency.

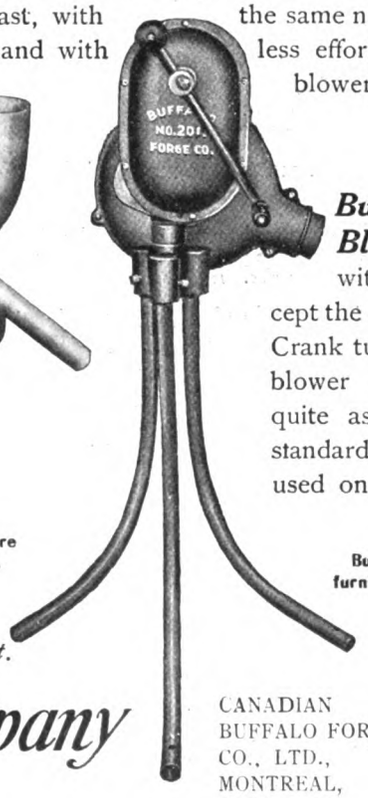
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Blast—We positively guarantee the Buffalo No. 200 Blower to produce a stronger, more powerful blast, with the same number of turns of crank, and with less effort, than any other blower in the world.



Buffalo No. 200 Blower and new H. H. Tuyere which now goes with every machine. Crank turns in direction of arrow.



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Buffalo No. 201 Blower furnished with H. H. Tuyere.

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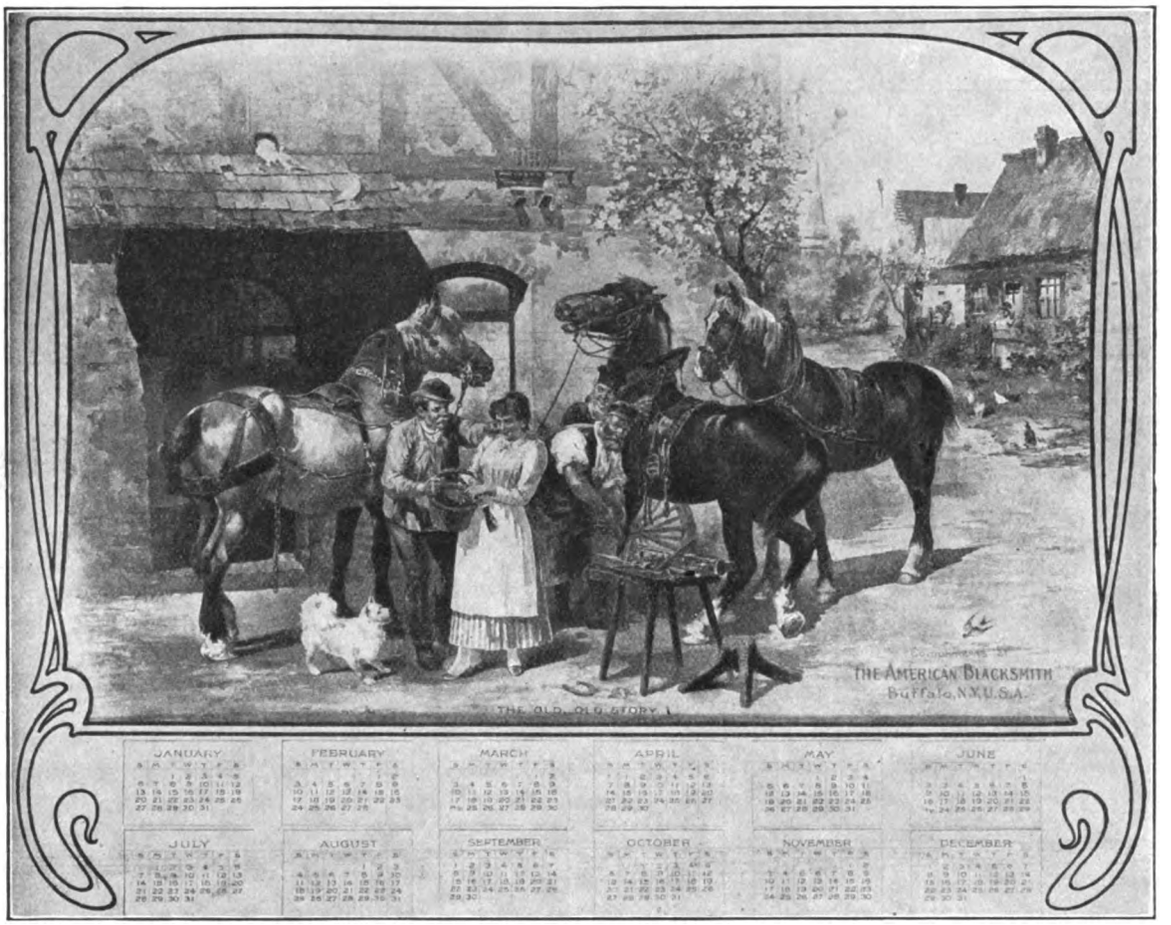
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Painted by RICHARD VAN FLEET

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An Artistic Calendar is the Best and Cheapest Way of Advertising Any Business

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American Blacksmith Company

P. O. Box 974 **BUFFALO, N. Y.**

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chemically weld iron and steel at a low heat—
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and our new booklet entitled
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It tells you things you should know.
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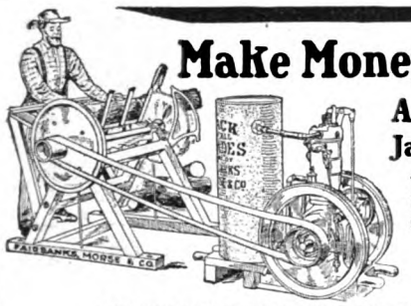


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MASSACHUSETTS SAW WORKS, Chicopee, Mass.



Make Money Selling Our Engines

A Fairbanks - Morse Jack of All Trades Engine

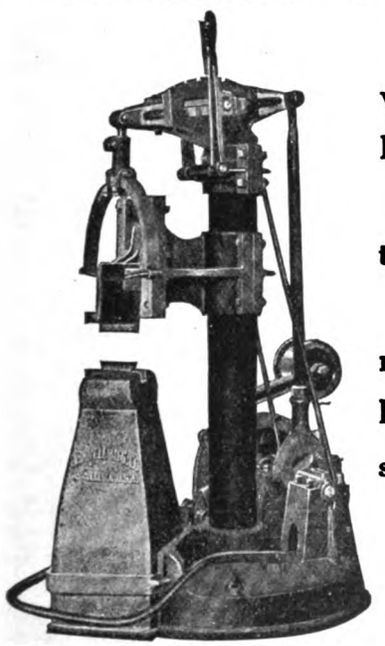
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Modern Power Hammer



The ONLY hammer on which you can get a LIGHT BLOW at FULL SPEED.

The shifting lever controls the length of stroke.

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Actually five hammers in one.

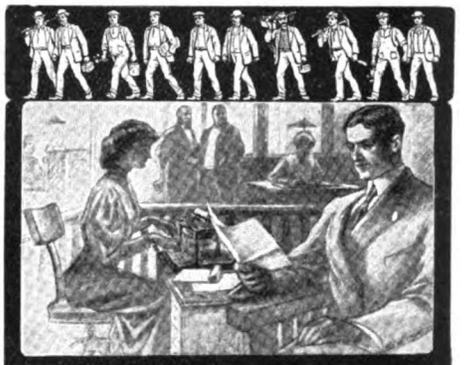
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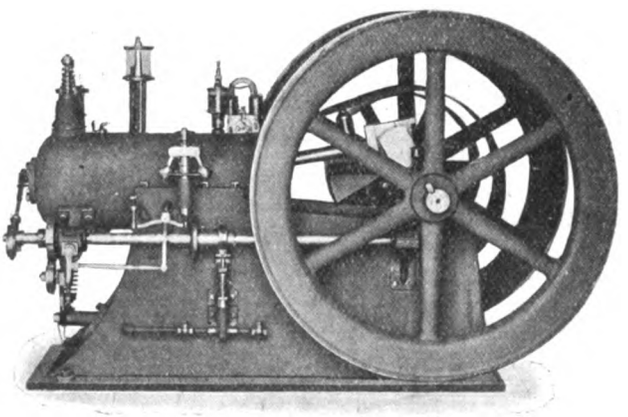
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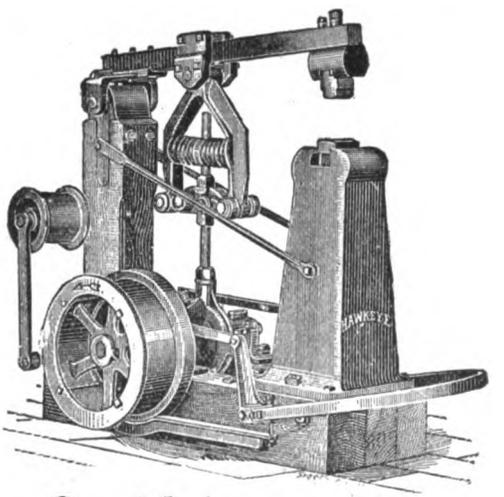
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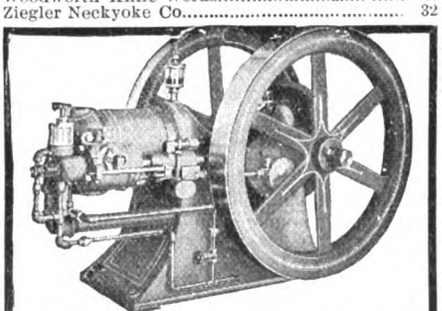
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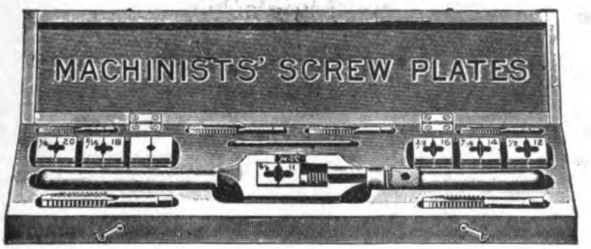
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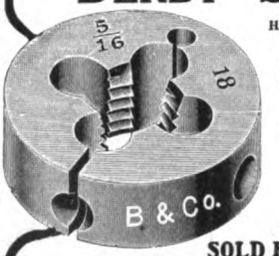
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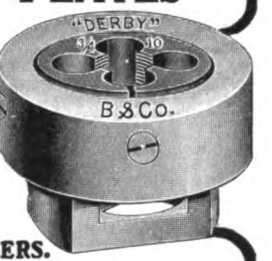
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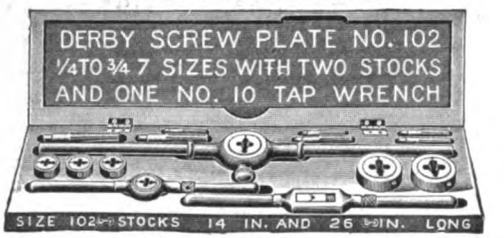
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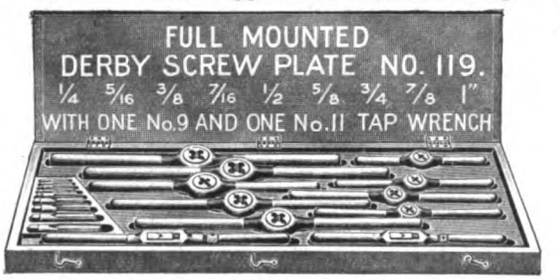


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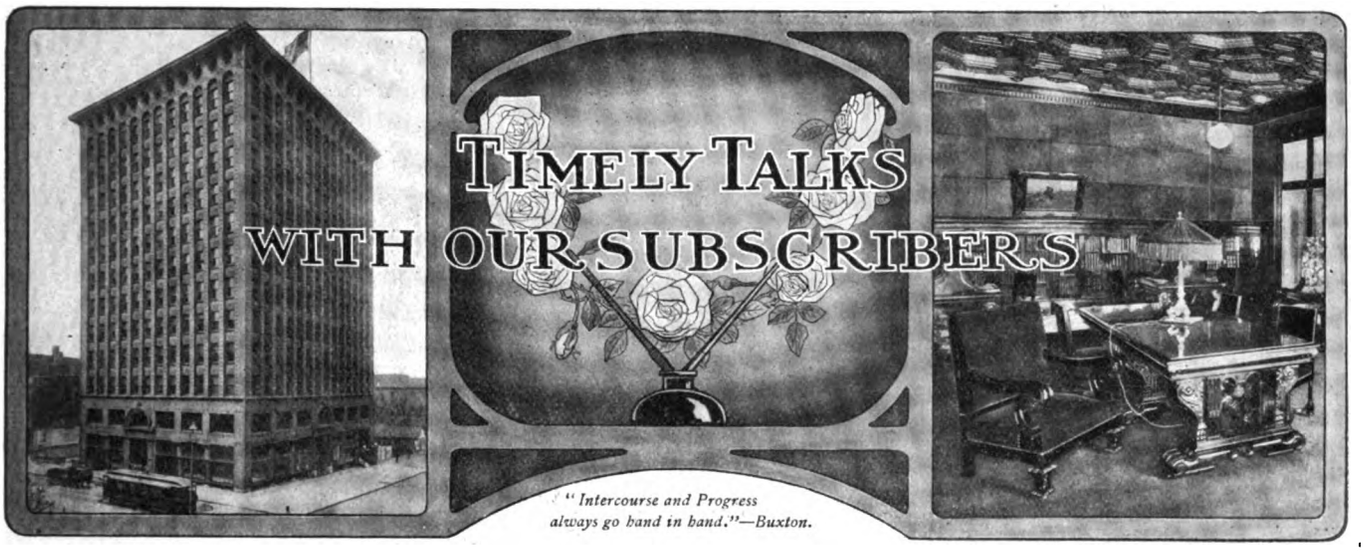
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Subscribers should notify us promptly of non-receipt of paper or change of address. In the latter case kindly give us both the old and the new address.

We are now gathering material for the shop-equipment number which is to appear early next year and the best photographs, equipments, and lay-outs sent in before that time will be held for special attention in that number. We therefore want every reader, who has not already done so, to send in a photograph of his shop. If you can, send both an outside and an inside view. Some excellent shop pictures and lay-outs will be shown in the equipment number and if you haven't already sent in a photograph of your business place you had better get in touch with your photographer now. Of course it always adds to the interest of the picture to tell about your machinery, tools, work and prices. Can we not count upon your photograph at an early date?

The October paper was somewhat late in making its appearance but we trust that you were amply repaid for your patient waiting by the surprises which greeted you on opening the first number of volume six. We have yet to hear of one reader who was not immensely pleased with the new volume and its many changes, and we hope that if you have not already given us your opinion of the new paper, you will do so now. This journal is your very own. We want you to speak of it as such and to tell us just what you want in it, what you need in your every day work. It is our constant aim to make the paper more valuable each month, but in doing this we need your co-operation. If you do not think your branch of the craft is receiving proper attention in these pages do not hesitate for one minute to tell us about it. We want you to be a satisfied reader and to tell us when things do not please you. If you are thoroughly satisfied with "Our Journal" won't you please tell your neighbor smith? Of course you are well aware of the fact that the more subscribers we have the better and more valuable we are able to make the paper.

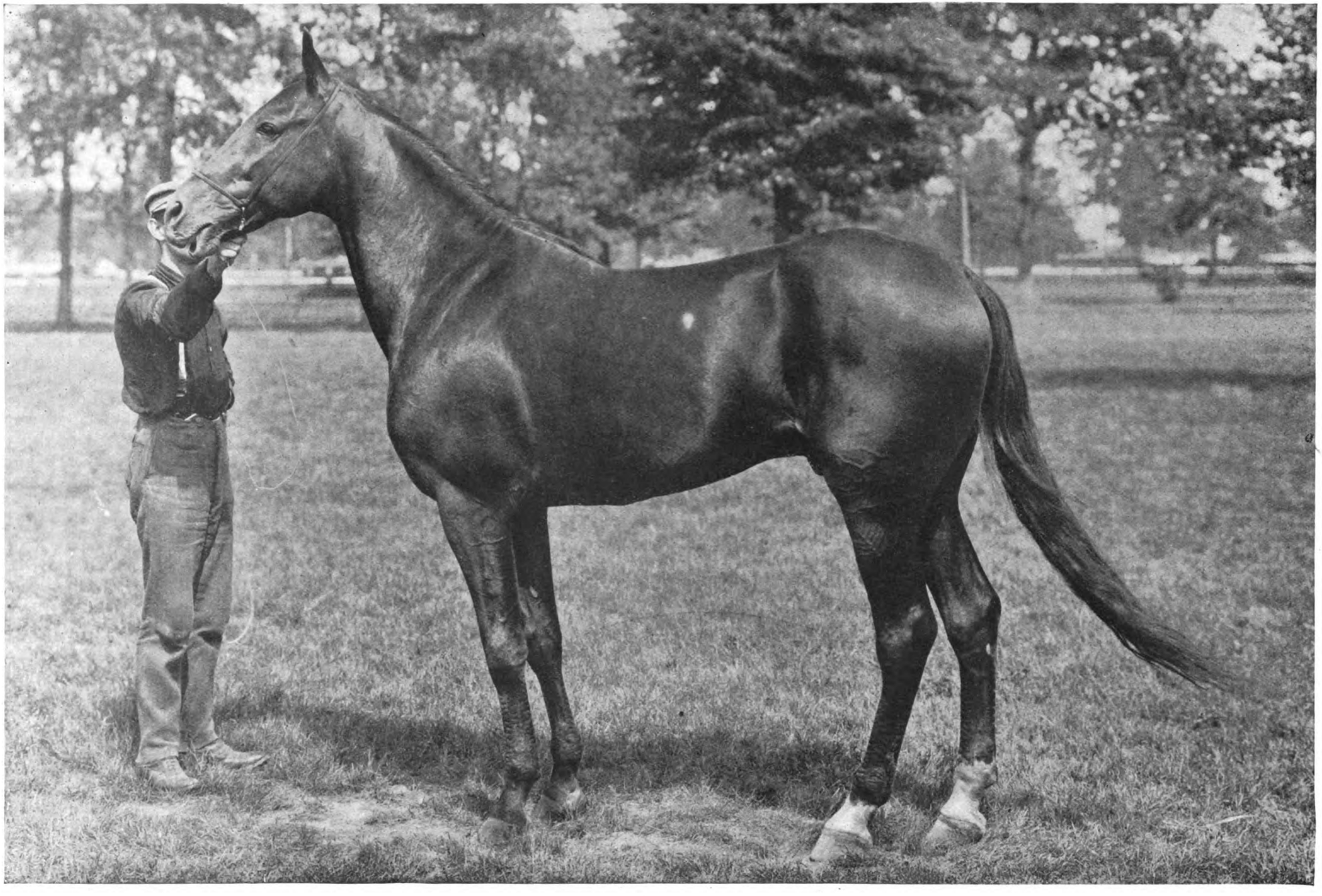
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There is only about one month left before submitting your prize contest articles. The contest closes December 10th, so you will want to start your articles now and get them in on time. Remember there are five cash prizes of $5.00 each, while every contestant whose articles are published gets one years' subscription to "Our Journal." You need not be a college professor to win a prize. Just give us something practical—something that will be of value to the every day craftsman. It matters little how you tell about it, as long as you make the matter clear. If you have a side-line give a good, solid talk on this, telling us how you started it, the amount of your sales, your profits and anything else that a smith without one would like to know. If you have an engine give a talk on "Before and after using," tell us how your trade has increased, the comparative costs of running a shop with and without power. There are plenty of happenings about your shop in which your fellow craftsmen will be vitally interested; all you need do is to tell about them. Don't forget the closing date, better have your manuscript in a week ahead of time than too late.

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Anatomy of the Horse's Foot and Leg.

E. W. PERRIN.



THE study of the anatomy of the horse's foot and leg is indispensable to the practice of scientific horseshoeing. The great need of a more intimate knowledge of this important branch of the art of horseshoeing is emphasized in the large number of horses you may see today with the hoofs fitted to the shoes instead of the shoes being fitted to the hoof. After all that has been written upon the subject there are thousands of smiths shoeing horses today who have no knowledge of the living organism enveloped by the hoof on which they work every day.

The preparation of the horse's hoof for the shoe is an operation which requires an intimate knowledge of the foot and its relation to the limb of which it is the base. Where to cut and where not to cut; why the hoof of this horse should be high at the heels, while another should be low; how to level a hoof, etc., are problems which cannot be understood without a study of anatomy.

A dissection of a right fore-leg from the elbow to the foot is shown at Fig. 1. In this specimen the skin, connective tissue and hoof have been removed so as to show the muscles of the arm and the tendons and ligaments of the foot. In describing this specimen, I want to call your attention to the foot in particular. You will observe that it is the exact counterpart in shape of the hoof into which it accurately fits. Seeing that this horny box—the hoof—envelopes one of the most complicated organs of the whole body, the intimate relation of hoof and feet become more apparent, and the knowledge of anatomy and physiology is appreciated as indispensable to scientific shoeing.

The sensitive laminæ is shown at A, while C is the coronary cushion and really a continuation of the true skin of the leg. The coronary cushions run around the foot at the coronet, lying in the depression at the top of the wall of the hoof. Its surface is covered with hair-like projections which fit into minute tubes in the wall of the hoof. At the heels the coronary cushion turns in and forward to form the bulbs of the sensitive frog. The function of the coronary cushion is to secrete the wall of the hoof, hence, whenever there is an injury to the coronary cushion there is a corresponding flaw in the wall of the hoof. Occasionally, owing to a severe injury, a portion of this cushion is lost, in which case the wall grown by it will be absent and only the inner layer of soft horn will cover the sensitive laminæ. Since the advent of barb-wire as a field fence, the number of defective hoofs resulting from wire cuts on the coronet has been very large.

The sensitive laminæ is a highly vascular membrane, which extends from

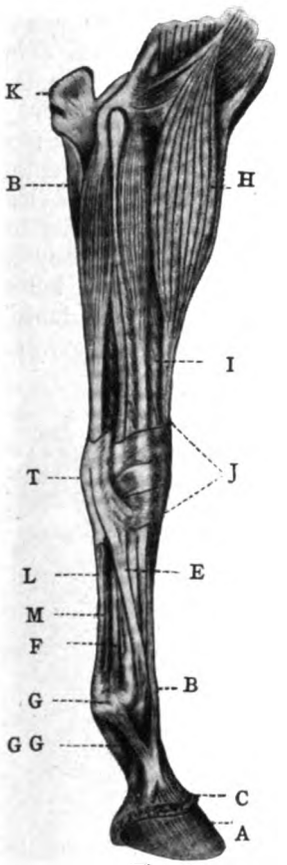


Fig. 1.

K—Ulna, or Elbow.
B—Extensor of the Phalanges.
T—Trapezium.
L—Flexor Perforatus.
M—Flexor Perforans.
F—Superior Sesamoidal.
G—Attachment of tendon "F."
G G—Branches of tendon "F."
H—The great extensor of the Knee.
I—The lateral extensor of the Knee.
J—The Annular Ligament.
E—Lateral extensor of Foot.
B—Extensor Pedis.
C—Coronary Cushion.
A—Sensitive Laminae.
E—Lateral extensor of Foot.
N—Small Metacarpal Bone.
K—Large Metacarpal or Cannon Bone.
R—Os Suffraginis.
B—Extensor pedis.
U—Os Coronae.
X—Insertion of "B."
Z—Os Pedis.
M—Flexor Perforans.
P—Metacarpal Ligament.
F—Superior Sesamoidal.
L—Flexor Perforatus.
G—Attachment of tendon "F."
G G—Branches of tendon "F."
O—Bifurcation of Perforatus.
M—Flexor Perforans.

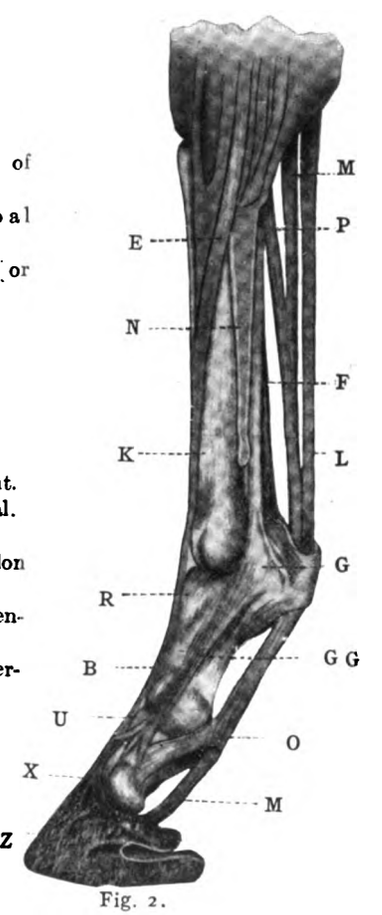


Fig. 2.

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the coronet to the plantar surface in a large number—500 to 600—folds or leaves. Each leaf dove-tails into corresponding horny leaves of the insensitive laminæ within the wall of the hoof. The sensitive laminæ covers the entire os-pedis or foot bone, and is the only membrane between it and the hoof. At the heels it turns under the plantar surface following the course of the bars. It is plentifully supplied with nerves and blood-vessels, and its function is to secrete the inner layer of soft horn and share in sustaining the weight of the animal. Muscles are composed of red colored material which, under a magnifying glass are seen as innumerable threads or fibres, bound up into bundles of every conceivable shape according to the particular function they perform. By contraction of this muscular fibre, the various parts of the body are moved. A muscle is attached to a bone at one end in a fixed position called its "origin." It is usually attached at its other end to a tendon or ligament which is called its "insertion." In Figs. 1 and 2, B is the extensor pedis which takes its origin at the elbow. Just above the knee the muscle joins the tendon, descending the outside front of the knee, following the course of the cannon bone K, and over the front of the phalanges, joining with the branches of the tendon superior sesamoidal at the os coronae U, and is finally inserted in the pyramidal process of the os pedis at X, Fig. 2. Its function is to extend the foot. E is the lateral extensor tendon of the foot and is joined to its muscle above the knee and is inserted into the phalanges of the foot. Its function is to give lateral movement to the foot. The tendon superior sesamoidal at F is commonly called the suspensory ligament. It is a powerful brace, takes its origin in the back of the knee and descends about two thirds the length of the cannon bone. At this point it bifurcates, one branch being inserted into each sesamoid bone at the fetlock G, from where the branches GG extend downward and forward joining with the extensor pedis and are finally inserted in the sides of the os coronae. In Fig. 1 H corresponding to the large muscle of the arm, it is the great extensor of the knee. I in the same figure is the lateral extensor of the knee. J is the wide, flat band which encircles knee—the annular ligament. K is the ulna or point of the elbow, the peculiar construction of which forms a fulcrum for the action of the muscles attached to it. L in both Figs. 1 and 2 is the tendon flexor perforatus, which has its origin in its muscle above the knee. It descends the back of the leg just beneath the skin, to the fetlock, to which its borders are attached at the sesamoid bones. Here it forms an oval shaped tube through which the tendon flexor perforans passes on its way down to the foot. From the fetlock the perforatus descends the back of the pastern for about four inches, at which point it divides into two branches, which extend downward and forward and are inserted laterally on the lower border of the os suffraginis, and the upper end of the os coronae, on which bones they act simultaneously, inflexing the pastern. M Figs. 1 and 2 is the tendon flexor perforans which is joined to its muscle just above the knee and from whence it descends the back of the leg, lying close to the perforatus. About midway between the knee and the fetlock it is joined by the metacarpal or check ligament, P in Fig. 2. The upper end of this is inserted in the head of the cannon bone. The perforans passes down at the back of the fetlock, through the tube formed by the connecting cartilage of the sesamoid bones and the perforatus tendon. From this point the perforatus forms a sheath for the passage of the perforans to the point of its (perforatus) bifurcation, O, Fig. 2. Here the perforans drops through and descends to the foot, passing over the navicular bone (not seen in these engravings) and is finally inserted in the semi-luna crescent of the os pedis. The function of this tendon, as its name implies, is to flex the foot.



FRONT VIEW OF THE BONES OF FOOT AND FETLOCK

It will be seen from a mechanical standpoint that when these flexor tendons (those at the back of the leg) are acted upon by their contracting muscles, they act like ropes upon pulleys by lifting the limb. When the extensor tendons (those on the front of the leg) are acted upon by the contraction of their muscles, they extend the limb.



SIDE-VIEW OF THE FOOT BONES

Each articulation glides upon its well lubricated surface in obedience to the action of its tendons and ligaments. The intelligence conveys its will through the motor nerves to the voluntary muscles, which contract and relax in obedience. Thus a marvelous animal economy performs the movements of the body. What a wonder that so complicated a structure keeps in repair so long, even under the disadvantages of improper shoeing. The foot being the base and the foundation of the limb above it, imperfect shoeing may and does affect not only the foot, but the whole limb. Hence the importance of the subject can scarcely be over estimated.



During colthood a horse must have special attention as far as the feet are concerned. The feet at this time are not very strong, and but little will twist and turn them out of shape. The colt well balanced and rightly shod for two or three years is in a fair way of having a perfect gait, and leg and hoof formation. By all means have each pair of shoes equal weight. R. I. M.

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In shoeing the hunter use light, well-formed shoes, with a flat foot-surface and a concave ground surface. The hind shoes should be smoothed and rounded at the inner toe so as to prevent injury from over-reaching Small, square calks will afford the necessary grip on grass and sod. The use to which a horse is put should always enter into the shoer's calculations. W. H.

Remember that the horn tubes of the horse's foot run downward and parallel to the direction of the wall at the toe, and that if an ointment or other hoof remedy is to be applied it is best placed in the hoof at the bottom. The remedy will here be quickly absorbed and will reach the interior of the foot much quicker than if it be applied to the wall where the protective covering must first be entered. J. F. FOOTE.

That lameness results from repeated sharpenings in winter is well known. The removing of the shoes from four to six times per month for the above purpose certainly does not influence the hoof for the better. It is, therefore, best to use removable calks as far as possible. These will do away with the necessity of removing the shoes, and will prevent the damaging of the hoof, irregular bearing due to hurried fitting, and conditions that are decidedly injurious to any but the very strongest hoofs. Some horseshoers seem to think the removable calk a fad, but the sooner they get over this idea the sooner will they be helping themselves on to success. R. J. MARTIN.

A California Shoeing Shop and Some Special Shoes.

J. W. TISDALE

The accompanying engravings show my shoeing shop and also several of my special shoes, my entire collection containing over 150. Should my brother craftsman be interested in these shoes I will be very glad to send in a photograph each month for their benefit. No two shoes in this collection are exactly alike. I have devoted my entire life to a study of the horse, either in shoeing, driving or breaking. When trimming the feet I never cut out the bottom of a horse's foot, neither do I cut the frog, which I think is the secret of successful horseshoeing. My entire collection of special shoes was made by myself and a helper, and I have been very successful in shoeing horses. Several customers come as many as 100 miles to bring animals to be shod at my shop. I have customers at San Francisco, Sacramento, Stockton and man of the smaller towns near by. I shoe not only road horses but also mountain-drive and track horses. The following will fully explain the various shoes and their various uses:



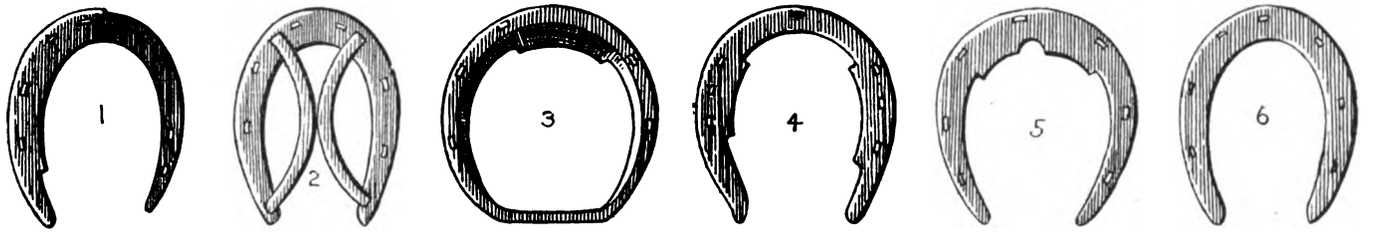
A FEW SPECIAL SHOES WELL TURNED

Number 1 is a toe weight rolled motion shoe; 2, inside weight, used on the grandson of old "Electioneer," the hind shoes which stopped him from interfering; 3, is for quarter crack. Where the heel and quarter crack is high leave the shoe open over the crack so the shoe will close when on; 4, is for the paddler; 5, a heel weight shoe to stop forging, has a round toe; 6, for the knee knocker has a heavy side weight; 7, a special bar-shoe; 8, for cross firing; 9, a bar shoe, split in the middle, for open heel when the animal walks on his toes; 10, a toe-weight shoe to stop the horse from trotting or pacing; 11, a special hind bar-shoe; 12, a 6-ounce front bar-shoe; 13, a hind-bar-shoe with an open heel, used when the frog is gone; 14, a 5-ounce trotting plate; 15, for interfering, weight on the inside of the toe; 16, for a pigeon-toed animal, shoe heavy on the inside and the outside of the toe in order to make them pitch out; 17, bar shoe with miniature anvil, toe-weight 12-ounce shoe; 18, a special hind shoe with outside weight for use when he travels too wide, will make him travel close; 19, hind 4-ounce trotting plate; 20, trotting plate with calks used when inclined to slip; 21, for cross firing with side weight, 10-ounce shoe for pacer; 22, bar trotting plate 11-ounce shoe; 23, a 10-ounce shoe for the knee knocker with heavy side in, with a bevel on the outside from the first nail hole to the middle of the toe. This gives the best satisfaction of any shoe I have ever made; 24, a 5-ounce trotting-plate, hind, square toe, raised heel on the inside; 25, is a nine-ounce pacing plate, high on the inside front for interfering; 26, nine-ounce tip; 27, an ornamental



THE HORSE OWNER GOES FAR OUT OF HIS WAY TO SEEK THE SCIENTIFIC SHOER

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THE SCIENTIFIC SHOER MAKES A CAREFUL STUDY OF SPECIAL CASES

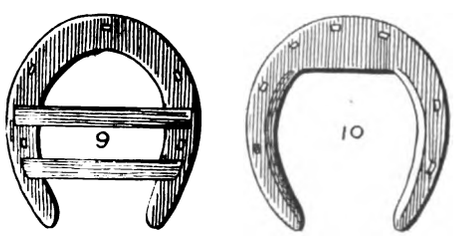
toe weight 7-ounce shoe; 28, eight-ounce tip; 29, nine-ounce tip.

Several Shoes of Special Shape.

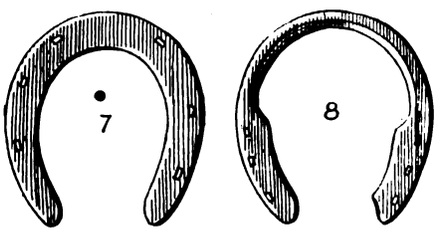
GEO. F. WHERRY.

The accompanying engravings show several styles of shoes which I use for shoeing different gaited animals. There are many more on my list, but these cover the general field of regular shoeing pretty thoroughly.

Number 1 is an outside weight shoe and is used in some kinds of interfering. It causes the horse to throw his foot out and away from the other foot. Number 2 is a stifle shoe, or it may also be used to hold hoof packing in place. For this purpose alone it is too difficult to make as the same thing can be accomplished with a leather pad. Number 3 is a bar shoe with a toe weight. Number 4 is a side weight shoe for either front or hind feet. Number 5 is a toe weight for regulating the action of the front feet. Number 6 is a plain hind shoe. Number 7 is a plain front shoe. Number 8 is a special shoe for deadening the stride of the hind or front feet. Number 9 is a double bar speed shoe. Number 10 is another style of toe weight shoe. Number 11 is a shoe for cross-firing and some forms of interfering. Number 12 is a snow shoe. The inner edge of this is concaved so as to prevent the balling of the shoe with snow. Number 13 is an old style side weight shoe. Number 14 is a double half bar shoe. This shoe is excellent for curing corns and weak heels. Number 15 is another style of side weight shoe for interfering. Number 16 is a single half bar shoe for corns or quarter crack. Number 17 is a combined toe and sideweight shoe. Number 18 is a bar shoe with a side weight. Number 19 is a special shoe with a light bar for speeding. Number 20 is a plain bar shoe. Number 21 is a special shoe for deadening or shortening the stride. It may be used on front or hind feet. Number 22 is a front shoe with a side weight for the cure of interfering. Number 23 is another toe weight shoe. This style is perhaps the best for general purposes. Number 24 is an old style convex toe weight shoe.



A DOUBLE-BAR SPEED SHOE AND ANOTHER STYLE OF TOE WEIGHT



A PLAIN FRONT SHOE AND ONE FOR DEADENING THE STRIDE OF THE HIND OR FRONT FEET

Shoeing With Pads.

TOM. FUGUA, JR.

(Prize Contest).

I have used quite a few rubber pads on both paved streets and dirt roads, and find them very good for certain classes of horses, such as have corns, shoulder lameness, and in fact all chronic lameness. In using rubber pads you must use judgment and shoe according to the foot. Be sure always to have the bearing on the frog. I first prepare the foot just the same as if I was going to shoe with a plain shoe. But I trim the foot so as to have the pad rest on the frog instead of resting on the heels. When you get the foot trimmed, rasp all the rough edges off around the outside of the hoof, then lay the pad on, letting the heels come where they belong. Take a pencil and mark around the pad just the size of the foot, then take a knife and cut the pad out to the mark. Fit your tip or half shoe (as they are called) to the pad, and then you have an exact fit and no trouble to drive.

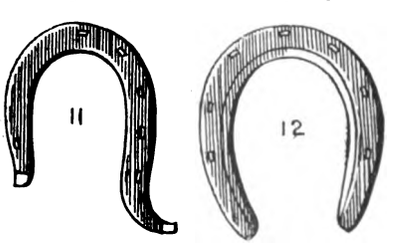
I always use a leather back pad, as a canvas back will not last and they tear too easy. Pads are very seldom used on the hind feet, but are used on the front feet with good results, as they take the jar off the foot and shoulder, and a horse is less likely to slip on sleet and ice. You can cure corns by shoeing with rubber pads if you put all the pressure on the frog and keep it off the heels. But never let a pad stay on longer than four weeks, as they heat up the foot and cause moisture. They should be removed and all of the rotten sole of the foot cut away. By repeating this several times you will soon find you have a sound foot and don't need pads. I sometimes pour warm tar under the pads by raising the pad at the heel. Pouring the tar down each side of the frog is found to be good for both the pad and the foot.

The Scientific Side of Horseshoeing.

C. W. METCALF.

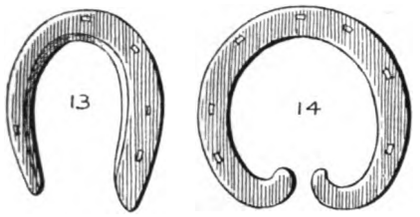
(Prize Contest).

The growth of a horse's hoof is like a finger nail, and unless it is worn off at the bottom or bearing surface it becomes too long. If worn off too much the sensitive portions of the foot do not have sufficient protection and the horse goes lame. In a natural state, however, the horse's hoof keeps itself perfectly proportioned. If the ground is hard the horny portion is worn away as fast as it grows. All shod hoofs become overgrown in from 4 to 5 weeks. In such cases there appears to be an excess of horn at the toe and since the horny fibers do not grow straight down, but obliquely forward, the plantar surface of the foot is carried forward. This throws it out of proper relation with the rest of the foot and injuriously affects every part of the foot, in fact the entire leg may bear directly upon it.



ONE FOR CROSS-FIRING AND SOME FORMS OF INTERFERING AND A SNOW SHOE

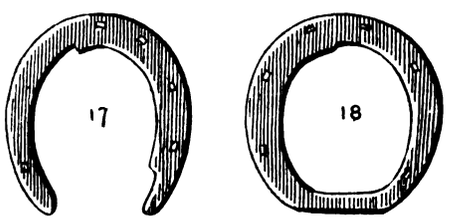
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AN OLD STYLE SIDE WEIGHT AND A DOUBLE HALF BAR SHOE

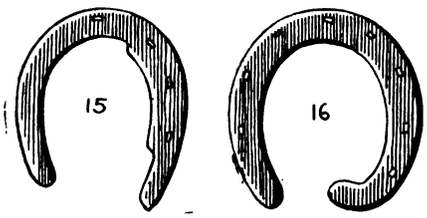
On an average the wall will grow an inch in 3 months, and the whole hoof is replaced in from 10 to 15 months. The more actively a horse is exercised the faster the hoof grows, and inflammation checks growth. If there is no bearing on a certain part it will grow quickly and become even with portions that receive the bearing. If the hoof be broken or rasped away to relieve pressure, in a month's time that part will be found in all probability flush with the shoe. The sole grows in the same manner as the wall, but it wears away quite differently. It never becomes overgrown, like the wall, for it becomes flakey, dry and brittle, then breaks and falls out. When the frog comes in contact with the ground it wears off in shreds. The horn of the frog is softer than that of the wall or sole and stands wear as well as either of them. As it is elastic and rests upon a still more elastic cushion, it yields and leaves the wall and sole to bear the strain. The growth of the frog depends largely upon the condition of the bars. If these are overgrown the frog receives no bearing and wastes away. High heels are always accompanied by a small frog, and low heels have a large frog. Horn is porous and absorbs water readily. If too much water is absorbed the horn is of course weakened. The natural protection to this is the varnish-like outer wall, and when this is removed by rasping moisture is more easily absorbed, until the horn beneath becomes hard and brittle from exposure and friction, as we have already said. Horn is a poor conductor of heat, therefore, if the horn is thick, fitting a hot shoe for a reasonably short time does no harm, but it is not well to follow this practice. It is very important in shoeing a horse that the bearing surface of the foot on which the shoe is placed be perfectly even and that the horn be of equal height on both sides. If one side is trimmed off more than the other, the side of the wall left too long will, in time, become bent, and a crooked hoof results, in which the rings are placed nearer together on the low or concave side than on the high or convex side. The toe, also, if left too long, will in time become bent, and heels which are left too long will in two or three months contract just under the coronary band or curl inward at the lower borders.

Wear on the hoof is affected by the position of the legs. As there are badly formed bodies so also are there badly formed hoofs. The form of the hoof depends largely upon the condition of the limb. A straight limb, as at A in the engraving on the following page, has as a rule a well-balanced regular hoof, while a crooked limb has a hoof to match. At B is represented the base wide position of the legs in which the plumb line falls inside of the



COMBINED TOE AND SIDE WEIGHT AND A BAR SHOE WITH A SIDE WEIGHT

limb and entirely inside the position of the hoof. A variation of the same position is shown at C, where the knees are knocked in. The pigeon-toed position of the feet is shown at D. This is a condition in which the plumb line falls entirely outside the hoofs. The toe-in or base narrow position is to be observed not infrequently in horses with wide breasts. At X is shown the track of the well balanced animal shown at A. Y shows the track of animals B and C, while Z shows the track of the animal at D. The normal position of the limbs as viewed from the side is shown at E. A plumb line dropped



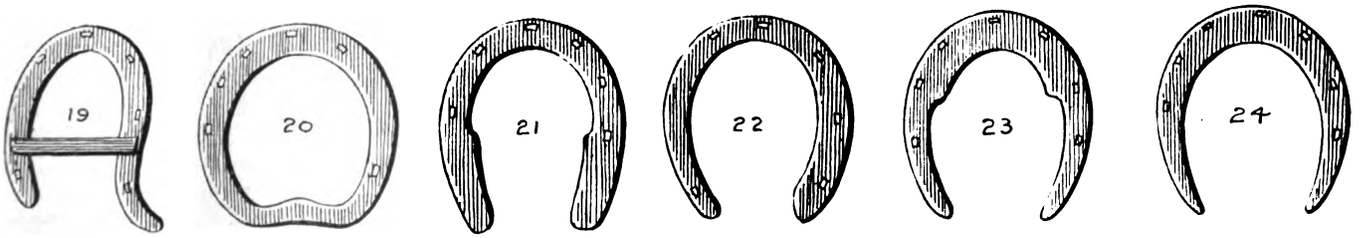
ANOTHER STYLE OF SIDE WEIGHT AND A SINGLE HALF BAR SHOE

from the middle of the shoulder blade divides the foreleg into equal parts above the fetlock and touches the ground just back of the heels. The line formed by the three phalanges of the foot should form an angle of 45 to 50 degrees with the ground.

A Contributor's Mistake.

A VILLAGE BLACKSMITH.

There is one class of writers to THE AMERICAN BLACKSMITH that has made a mistake, at least it seems so to me. I mean the fellows who send in glowing accounts of how they were prospering; always behind with their work; never could catch up; gave a long list of tools; told us what wonderful things they were going to do, and then never another word do they send. Now the question is why don't these parties send in a few more articles telling us how they managed to get all this trade. They may know a few ways of making money that the rest of us know nothing about. They may know some way of employing time that would be a benefit to the rest of us. There is not one smith that reads these columns but what could send in some little article that would help the rest of us. So let us all do our part and remember that nothing is too good to give for the benefit of the craft. I have been a reader of THE AMERICAN BLACKSMITH from the start, have never missed an issue, and it has become as necessary to me as my daily bread. If I were to try to tell of all the benefits I have derived from its pages I am afraid this article would be consigned to the waste basket for want of space. One thing I would like for everyone who reads these pages to



THE PROPER SHOE IS SELECTED AFTER A CLOSE EXAMINATION OF THE HORSE

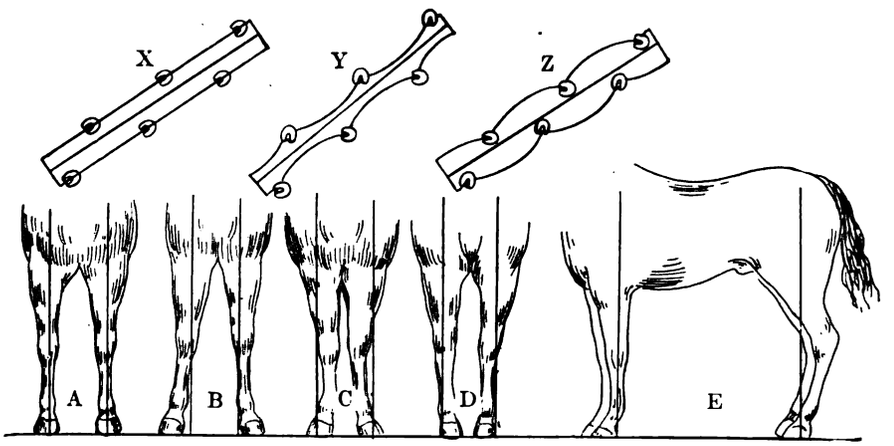
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think about, is the effort that is being made by this paper to get smiths to organize for better prices. Therein lies our only hope to better our condition and get what is honestly due us for our labor. Ninety per cent of the smiths with whom I come in contact freely admit that our prices are not high enough considering the advanced prices of material. I for one am ready to organize so as to get what I honestly believe is my due.

Another Plea for Fair Play.

BY A WAGONMAKER.

I noticed in the September number of THE AMERICAN BLACKSMITH an article headed "The Manufacturer and the Jobber." This article upholds the jobber. I wish to state that the blacksmith and wagonmaker are not as fully protected as they should be under present high prices and the close competition. It is wholly unfair for jobbers to supply parties with net priced catalogues of blacksmith and wagonmakers' supplies who are not entitled to such. I do not mean to insinuate that all jobbers will stoop to such unfair means of selling goods, but I know of some who make a business of sending net price lists to anyone who will write a postal card asking it. It is an easy matter for a jobber to learn if a party is entitled to wholesale prices. If a man is able financially to run a shop in these days of close competition, his envelopes and letters will contain advertising. He will also use sealed envelopes to write business letters, especially where prices are concerned. A man who will write for net prices on a postal card has little business ability, that is sure, and a firm should send no net prices to such parties. I have dealt with two or three firms who sow their net priced catalogues broadcast among the farmers and others who write postals cards asking for them. But I have quit them for good. I am now dealing with a firm who sends net price lists only to those who are in the trade. My customers do not know what I pay for my goods. No one can do business if his customers know what he pays for his stock. "What is everybody's business is nobody's business." I believe it is right for the manufacturer to protect the jobbers; that is his financial salvation. I also believe that the jobbers should protect the smiths and wheelrights for the same reason. There is where they butter their bread. Brother smiths, when you deal with a firm who send their catalogues to thousands of people, who use them to jew you on your prices do you ever think that you are paying for those catalogues yourselves? You who buy goods from these firms pay for posting your customer. All we ask of the jobbers is to give us the same protection the manufacturers give them. Then, and not until then, will we have fair play all round.



THE FORM OF THE HOOF DEPENDS LARGELY UPON THE CONDITION OF THE LIMB

How to Make a Gasoline Engine Pay.

A VILLAGE BLACKSMITH.

After you have installed your gasoline engine the next thing is to make it a paying investment. For the benefit of those who have an engine I will give here a few of the things we do aside from the regular work. We take an old thick axe and grind it down thin on the emery wheel and then finish it on the grind stone. You must not bear on too hard while grinding on the emery nor grind too long in one place, keep it moving and dip in a pail of water when it begins to get warm and you will never draw the temper. We get 25 cents for this job, and in the winter time we get lots of them. We also grind sickles for mowers. We get 25 cents for these and for sheep shears we get five cents each. We have a small emery stand that will carry a ½ by 8-inch wheel and use this for gumming saws. We charge 25 cents for a cross-saw and $1.00 for circular saws up to 30 inches; larger sizes up to $2.50. We grind rolling cutters for 50 cents each and disc harrows and plows at 25 cents per disc. We polish spades, shovels and hoes and do many other little jobs, and they all help materially to keep away the wolf from the door.



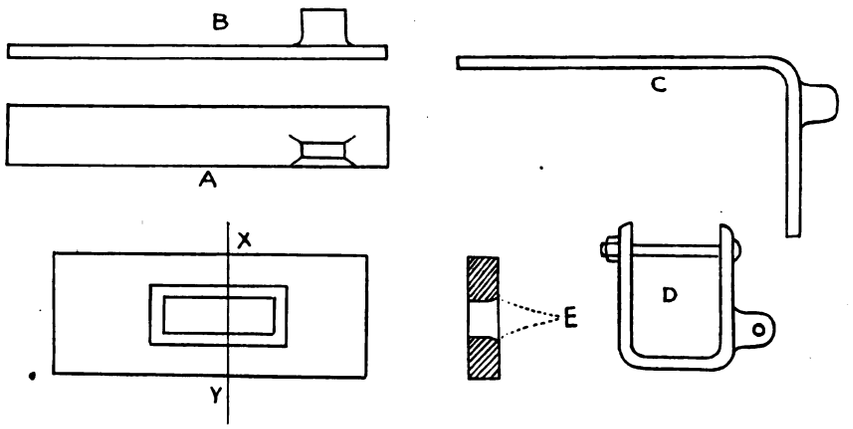
EIGHTY YEARS A BLACKSMITH

Eighty Years Behind the Anvil.

The accompanying picture is that of Mr. W. H. Wood, a veteran of the craft, whose life-story is probably best told in his own words: "I was born in the town of Pitsford, Monroe county, New York, in 1818. My father being a blacksmith I learned the trade. At the age of ten years I made two shoes and set them on 'Old Jin.' She was 26 years old then (when she was two years old my father shod her on the same feet) and I have followed shoeing ever since. At the age of 15 I hired my father's shop and commenced carrying on blacksmithing for myself. In 1840 I was married.

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I commenced business in the town of Bloomfield and in 1844 I moved to the town of Perrington, built me a forge, a shop and house and carried on my trade and managed three



HOW FITTINGS FOR WAGON RACHETS ARE MADE IN SOUTH AFRICA

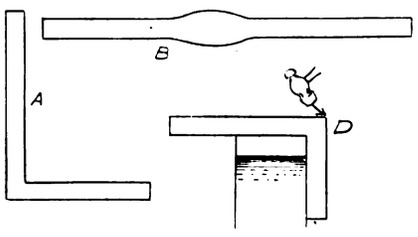
forges. In 1849 I moved to Fair Haven and carried on blacksmithing and shoemaking, and in 1854 I moved to Union City, Michigan, and went on a farm. But I was no farmer, so I hired a man on the farm and I hired out by the day in Union City. I worked for Mr. J. D. Zimmerman 12 years, then I came to Calhoon county, worked in Battle Creek and bought out a saw-mill west of the creek. In 1879 I traded it for a farm of 80 acres. In 1892 I disposed of it and moved to Lansing, Michigan, and here I remain in the blacksmith business to this day, and my neighbors say to me that by my looks I will work at my trade for 25 years longer."

And Mr. Wood's appearance certainly leads one to this belief, for he is exceptionally bright and active, and can still turn out a job that would surprise some of the younger members of the craft. Mr. Wood was 88 years old the 6th of last May. The picture shows him as he appeared in September.

Some Blacksmithing Operations from South Africa.

WM. W. WATT.

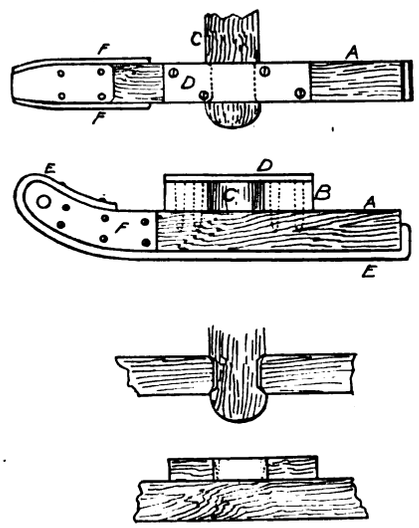
I desire to say a few words on forging a four-eyed band. The common method of doing this is by stumping on the piece to be worked out for the eye. Let us take, for example, a 2-inch band 12 inches in diameter by $\frac{5}{8}$ of an inch. This size will be easy for a young smith to manage. The length required to make a band 12 by $\frac{5}{8}$-inch inside measure is 3 feet $3\frac{5}{8}$ inches. I would take 2 by $\frac{3}{8}$-inch iron and the pieces for the eyes of a similar size or even thicker. Upset the ends well so that you can have a good scarf to ensure a sound job and take your fuller and make a good deep groove across the exact spot you desire to weld. Then have a good soft heat, and a good weld will be the result. Now, proceed with the next; care must be taken to get the exact distance from each stump. Then have a good heat at each stump when turning, and after welding, punch your eyes well up to the band and work out to the desired size. I have never seen this way fail to make a good sound job, but in doing a large band it is necessary to have assistance, and after a few blows with the sledge we generally use two hand hammers to put in the scarf, your helper at the back of the anvil with his hammer putting in one scarf while you finish off the other with the fuller. I should like to hear more from others on stumping. In preparing my stump I often make my helper use tongs and hammer, using the round end of the hammer, and with a very short heat the scarfs soon form up and leave a nice round shoulder. In some of these bands it is sometimes necessary to put them



BENDING SQUARE STOCK TO FORM AN ANGLE OR CORNER

on the skew and stumping must be done. I remember once showing a smith a mast strap on board a ship, with a joint and six pins, three on each. He asked, "But were these not riveted in?" I said no, and then showed him how the corners were rounded in so well with the fuller. In that case you must form your ball first.

Another job is often done by stumping, and that is making knees to have a nice, strong corner. I believe in stumping one piece on the other. But as I have said before let us have a word from some one else on the matter. I am rather far away and not much of a scholar to write. But another small job comes before me while I write, and that is making fittings for wagon rachets, largely used in Natal, and very essential to climbing steep hills. But I just send this to show the stumping. They are made from right to left. A shows the first stage where the stump is put on the bolster. I use it to weld in a small job like this. B shows the first heat after hammering into bolster. Then I cool up to stump and bend at corner, as



A SIMPLE FARM SLED FOR HEAVY WORK

shown at C. Then I take a light heat on the corner to insure the scarf being properly put in. D shows the article finished. I have not shown the pawl on this but it is hinged on to D and falls into the rachet on the hub of the wheel. At E is shown the bolster whose inside edges are rounded, as shown by the section at E, which is taken through X Y.

How to Make an Angle.

IRON BENDER.

Several articles have appeared in these columns relative to bending square stock to form a corner or angle, but I have not seen anything about my method of doing this. It is by no means a new method, but will simply

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be another method brought before the readers of "Our Journal."

To form the angle shown at A of ½-inch square stock, we heat the bar at the point to be bent. In this case at the center. It is then rammed on the anvil and the middle portion upset, as at B. This gives us sufficient stock for forming the corner. The piece is now bent by thrusting one end into the hardie hole. After bending at right angles, the piece is held on the anvil and the corner is made sharp, the blows being struck in such a manner as to drive the stock from the ends of the piece toward the corner. See D in the engraving. Care must be used to prevent the edge of the anvil from starting a crack at the inside corner of the angle. The corner may now be finished up with the flatter.

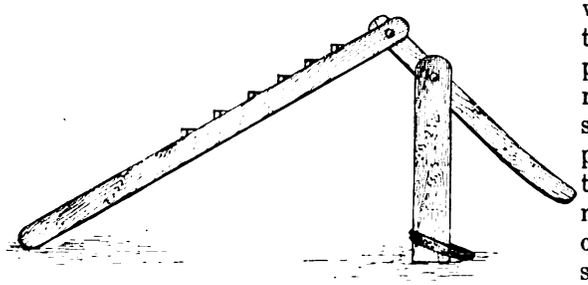
FARM HELPS.—1.

Implements for the Farmer which the Smith Can Make With Profit.

A Simple Farm Sled for Heavy Work.

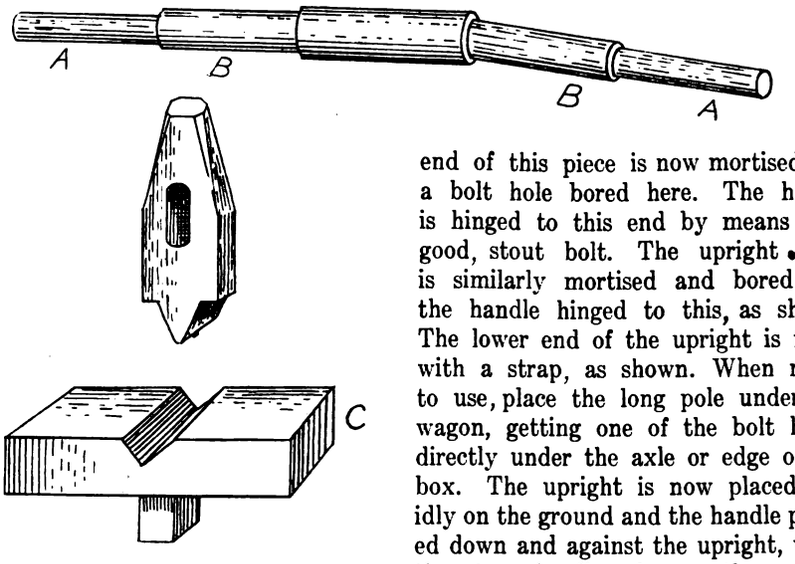
A. M. GILBERT.

The progressive country smith is continually on the lookout for plans of such articles and implements, used by the farmer, as he can manufacture in his own shop and sell to his customers with profit. The plans of a heavy duty sled given here present such an opportunity for added profit. The sled is very simple in construction and will prove very useful and helpful to the farmer within the snow belt. The stock should be good and stout and close grained. The runners A, while they may be of any size to suit conditions, are usually about five inches wide by four inches and from three to four feet long. The blocks B B are the same width as the runner and of the same height as the cross beams C C. An iron plate D D is screwed to the blocks B by means of four long heavy screws, which pass through to the runner. The beams C C are let down between the blocks by mortising in the manner shown in the engraving. If this joint is made so as to leave a slight space between the top edge of the blocks D D and the beam, the sled will give slightly on uneven ground and ease the strain considerably. In other words the channel between the blocks widens toward the top. The beam should, however, fit the bottom perfectly. The shoe E should be of ½-inch stock and cover the runner as shown. Two plates, F F, one on each side of the head of the runner, strengthen this part and minimize the wear produced by the connecting bars.



EASILY MADE AND VERY SERVICEABLE

The runners being finished, they may now be connected in any of the several ways known to the practical smith. The box or platform for these runners may be of most any dimensions as there is little or no possibility of the sled overturning because of the lowness of the runners. A sled of this kind is especially serviceable in drawing logs out of the forest. It can be heavily loaded and will draw comparatively easy on account of its broad runners.



SUGGESTIONS FOR THE AUTO REPAIRER

A Simple Wagon Jack Quickly Made.

J. L. PRICE.

The accompanying engraving illustrates a simple wagon jack that can be used for heavy as well as light vehicles if made of good sound timber. I have seen jacks on this same plan made from hickory limbs taken right from the tree when there was nothing else to be found for raising the vehicle. This jack is especially good for raising heavy wagons, and if made of good, sound stock is much stronger and better than the jacks usually sold by the supply houses. The long piece is first fitted up with old short bolt heads, as shown. This is to insure a good hold and will prevent the wagon from slipping after being raised. The top end of this piece is now mortised and a bolt hole bored here. The handle is hinged to this end by means of a good, stout bolt. The upright piece is similarly mortised and bored and the handle hinged to this, as shown. The lower end of the upright is fitted with a strap, as shown. When ready to use, place the long pole under the wagon, getting one of the bolt heads directly under the axle or edge of the box. The upright is now placed solidly on the ground and the handle pressed down and against the upright, when the strap is slipped over the end to hold the wagon in position.

For very heavy work the jack may be made in the form of a tripod, the upright consisting of two poles joined by cross pieces. The long pole may then also be heavier.

Several Pointers on Automobile Repairing.

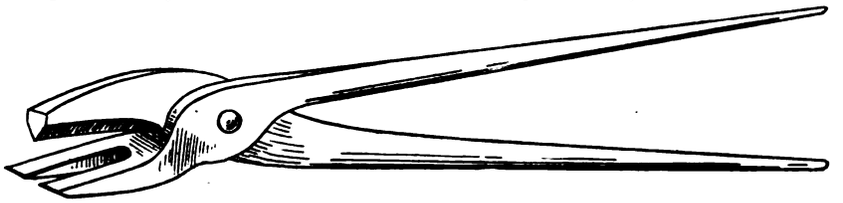
DAYTON O. SHAW.

The illustration shows an automobile shaft that is bent in the shoulder. To straighten this is a job that would be difficult for a smith to do without a lathe. The first thing to do is to get your lathe ready by setting the centers the right distance apart. Then put a dog on the straight end of the shaft and heat to a low red in the bend. Now straighten as near as you can by the eye. I use a wooden mallet for a hammer, as this does not dent the work. The ends A A run in a bush at B B. We heat again in the bend and put it on the centers of the lathe and start the lathe. Now hold a piece of chalk near the shaft so that as the shaft revolves the chalk will mark the highest point. Then stop the lathe, and, with the left hand on the belt, turn the chalk mark underneath. With a pinch bar pry up a little where the mark is and start the lathe again and chalk. If the mark is in the same place pry up a little more. The shaft was made al-

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most perfectly straight in this way. It was then taken to the forge, heated in a charcoal fire and hardened.

There is quite a call for springs, and those that come our way run in size from 1½ inches by 5/16 of an inch to 2 inches by 5/16 of an inch. The most common, however, are 1¾ inches x 5/16 of an inch. The repair man can not make them as cheap as the manufacturer, but the customer does not mind the extra cost if he can get them without waiting too long. To forge the top spring or leader I turn one end over a mandrel the size of the bolt and square up by the flat part. Then I turn the other end and square by the first. If the bolt does not go in easy, the hole might be reamed a little. To make the rise I have a die, C, that fits in the hardie hole of the anvil. The punch is made on the end of a chisel the right size to get the depth. After the spring is bent I turn the ends a little more, so that when the spring shuts up the ends will lie close.



HANDY FOR ALL KINDS OF STOCK

A Pair of Tongs for General Use.

F. C. BLACK.

A pair of tongs for handling all kinds of stock, round, square, octagonal and flat, is made, as shown in the accompanying engraving. The lower jaw is divided or forked, as shown, while the upper jaw is V-shaped. These tongs are made the same as the ordinary style tongs, except that the lower jaw is flattened and then split. It will probably require more stock for this than in the ordinary jaw, and will need to be allowed for when cutting the stock. It is understood, of course, that these tongs must fit the work the same as ordinary tongs.

Home-Made Polishing Wheels.

A VILLAGE BLACKSMITH.

When we first installed our plow grinder we did not buy a polishing wheel, for we thought we would polish with the emery wheel. It did not take us long to discover our mistake. So, when the salesman came we priced some polishing wheels. Yes, he had them 2 by 10, of canvas, at only $1.75 each. We bought one, also some glue and powdered emery. We dressed the wheel and it worked fine. We would point a set of shovels, grind them nice and smooth on the emery wheel and then polish them, and they certainly did look nice. But the trouble was we had only one wheel, and sometimes we wanted a polisher when it was too smooth to do the work. They cost too much to buy by the dozen, so we concluded to make them. We took some soft pine 10 inches wide, 1 inch thick, and sawed it into square blocks, put a hole in the center to fit the mandrel of the emery stand, rounded the corners with the draw knife, then put them on the emery stand, being careful to cross the grain of the wood. We used three thicknesses of the wheel, put on the washer and nuts, tightened up good and tight, and then took some No. 6 finishing nails and nailed them together. Then we made a turning gouge out of an old file and turned them up true, leaving them a little full in the center. We dress them with LePage's liquid glue and No. 80 powdered emery.



AROUND OUR FORGE FIRE.

"Why doesn't the country smith, looking for a side-line, build farm implements and appliances for his farming customers?" asked Benton, dropping into his accustomed seat. "There are any number of things he can make and sell at a profit." And thinking he had suggested something new, Benton leaned back with an air of self-satisfaction.

"The country smith does build farm implements and appliances," replied the Editor. "What he needs is new ideas and implements that are an advance over those planned and roughly made by the farmer. These ideas and plans we intended to give the smith in a new series of articles headed Farm Helps, which start in the November paper." Then, handing Benton the page proofs for the November issue, the Editor continued, "But the main feature of this paper are the articles and engravings on horseshoeing and horse anatomy. The articles with their accompanying engravings will help the cause of scientific and correct shoeing very materially."

Norton, the horseshoer, came in then. "What's this about helping correct shoeing?" said he.

"The November paper," explained the Editor, "contains some very excellent articles on the subject of shoeing and horse anatomy. Perhaps you will give us your ideas on them?"

"Well, when I receive my paper," replied Norton, after looking through the pages, "I am going to take care of it as if it were a five-dollar bill; I'm going to study it as though I were a school boy, and then I'm going to keep it handy at all times. Those articles and engravings are of much value to the horseshoer, and the smith who cannot learn something from them must certainly be a wise one."

"If that's the case, I don't see how you can keep up the standard," said Benton.

"Don't worry about that" replied the Editor. "We're planning some issues that will surprise you more than this one. The rapid progress the smith is making in this age is evident—man needs his aid on all sides. The shop is equipped with all up-to-date machinery, and only modern methods are employed. We want to give the smith the best paper possible. We've only just started to get out such a paper as we've always had in mind, and there's no telling where we will stop."

Joyce came in at this juncture, flourishing an old hard paint brush. "How can I soften it?" he asked, addressing Benton.

The latter pulled out his receipt book and read "Hard brushes—to soften, soak in hot linseed oil. If this doesn't affect the proper result, buy a new brush." Closing the book, Benton continued, "Best to always keep a brush in proper condition, Joyce. Buy a new one, pay a good price for it, and then keep it hanging in a closed jar or pail. A good method is to get a large candy pail, paint it inside and out. Then drive a row of long brads on the inside and about three inches below the top edge of the pail. When you have finished using a brush hang it in the pail, which should contain just enough water to cover the bristles of the brushes. The pail should also have a cover so as to keep out the dust and dirt. If you do this, Joyce, you'll never need to soften hard brushes."

"How about winter coming on and the brushes freezing solid?" said Joyce doubtingly.

"Just add a little glycerine to the water in winter. This will keep the water from freezing in ordinary cold weather and it won't harm the brushes."

Norton then started in to ask questions on some branch of his work, but the Editor brought the little meeting to a close.

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The Trooper to His Mare.

CHARLES G. HALPINE.

Old girl that has borne me far and fast
On pawing hoofs that were never loath,
Our gallop to-day may be the last
For thee or for me, or perhaps for both!
As I tighten your girth do you nothing daunt
Do you catch the hint of our forming line?
And now the artillery move to the front,
Have you never a qualm, Bay Bess of mine?

It is dainty to see you sidle and start,
As you move to the battle's cloudy marge,
And to feel the swells of your wakening heart
When our sonorous bugles sound a charge;
At the scream of the shell and the roar of the drum
You feign to be frightened with roguish glance;
But up the green slopes where the bullets hum,
Coquettishly, darling, I've known you dance.

Your skin is satin, your nostrils red,
Your eyes are a bird's, or a loving girl's;
And from delicate fetlock to stately head
A throbbing vein-cordage around you curls;
O, joy of my heart! if you they slay,
For triumph or rout I little care,
For there isn't in all the wide valley to-day
Such a dear little bridle-wise thoroughbred mare.



The Thanksgiving Turkey is next.

Contempt is the world's reward for the quitter.

What's your idea on sarven wheel repairing now? Still cut the rivets?

The Days are Shorter—what do you use for shop lighting, candles or electricity?

A little extra attention to the gas engine will not be wasted these days. You have one.

You hurt yourself and your competitor every time you cut the price. Don't do it.

An immense ranch of 17 million acres is operated by an ex-governor of Chihuahua, Mexico.

Keep at the heels of your debtors. Many a business man has failed because of inattention to collections.

A few shingles and a board or two may save loss when the winds of winter howl. Never too early to mend.

About 150 years ago the Earl of Chatham said the American colonists had no right to manufacture even a horse nail.

If you haven't business, advertise. If you have business advertise. 'Tis a poor rule that won't work both ways.

Cold Weather and gas engine troubles are again with us. Careful attention to the engine will insure smooth running.

Better brace it up before it smashes your toes. Good work is impossible on a shaky anvil. Get a new block if necessary.

Farmer customers in need of wagons, implements or harness? Better find out. It means business and profit to you.

He will never be a successful smith who trusts to luck. It's the chap who takes off his coat and goes to work who reaches his goal.

Bread is the staff of life and advertising is the bread of business. Cut off a good big slice and feed your would-be customers liberally.

Why not build a bob sled or two during the early winter months? They're always handy on a farm and could be sold at a profit, too.

Every job missed makes you just so much poorer. Of course you can't land all the business, but are you getting all you might?

Sand is best for extinguishing a gasoline fire. Better keep a box or two of it in the engine room. It's cheap, won't spoil, and acts quickly.

Lots of smiths will take advantage of the long winter evenings by "brushing up" on their craft knowledge. What books are in your library?

A layer of good roofing may pay better than another repatching. These roof coverings are easily applied, and a good one will last a long time.

Your business won't drift to success. You must swim against the stream with it—keeping everlastingly at it and shoving with all your might.

"**Be careful** in details, they bind the large matters and give them strength," said Thornton, when asked regarding his attention to small things.

The largest steel plates in the world are to be used in constructing a new Cunard Line steamer. The plates are of silicon steel and weigh ten tons each.

Like a shop without a forge is a smith without a paper. Keep in touch with your trade by reading all you can about it in a good craft periodical.

Inquire about his wife, the children, his crops and health. Your customer will appreciate this interest. Don't think its none of your business.

Pretty hard to collect after he has left town. Keep your eyes and ears open. A chance word overheard is often a tip to press for immediate settlement.

No time like the present for starting that county association with very little work. You can get together the craftsmen in your section and agree upon uniform higher prices. Write to the secretary today. The probable results are certainly are certianly worth the slight effort.

The country calls again upon its citizens to choose their law makers and representatives. Every smith's ballot will be influenced by nothing but an honest desire for good government.

Be a specialist—make a specialty of being the best horseshoer, blacksmith and general repair man in your community. There's no call for the "jack-of-all-trades and master of none."

Don't wait till the snow flies before calling a county meeting and securing higher prices. Do it now, while you think of it. A few cents advance will show up wonderfully in the bank account.

"**My prices are lower** than any smith's in town," said Tom the other morning. "Don't see why customers never stay by me." Our friend doesn't seem to realize that quality of workmanship is what counts.

'Tis just as reasonable to ask an ant to make honey as to try to turn out good work from poor stock, poor tools and a poor shop. You must get a bee for honey and a good foundation for good work.

A cyclone crier is one of the officials of an Oklahoma town. His work consists of arousing the people at the approach of a storm and getting them into the municipal cyclone refuge—a large centrally located cave or cellar.

A paper tire for automobiles has been invented. This tire consists of a thick rubber cushion next to the wheel rim, then a built-up section of heavy card-board to the required thickness and then a series of metal plates to protect the tire.

Much has been said about the American hen, but when you realize that her products for six months are worth more than a year's production of pig iron, and that she could pay off the National debt in less than two years, it's time to sit up and take notice.

By means of a marvelous scientific discovery called the water light, a system of under water illumination has been devised for the night spectacles in Hampton Roads at the Jamestown Virginia Exposition. Vessels sailing over a sea of light will be a sight undreamed of.

Ever think of the number of farm helps you can build right in your shop? Rakes, cultivators, clod levellers, corn stalk loaders, sack holders, cattle stanchions—the list is almost without limit to the smith with a little ingenuity. Investigate the wants of your patrons, then supply them. Start this side line today. It means pleased customers, a better reputation, and money in your pocket.

An English engineer, writing to a London paper, says: "Rails that have fitted swing bridges with plenty of clearance have had to be shortened repeatedly year after year, and only recently I have known an instance of a swing bridge which had been open for half an hour that could not be put back until some of the ironwork had been reduced. The bridge had been built for some thirteen years, and had been opened and closed during that time many hundreds of times. There is little doubt in my mind that iron heated and cooled alternately does permanently lenghten."

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American Association of Blacksmiths and Horseshoers.

Did you ever think of the possibilities of a postal card? There is no end to its possibilities. But in this instance, if used rightly, it will secure for you better prices, harmony with your brother craftsmen, and protection. Will you spend one penny for this? You know your prices are not what they should be. You know that the smiths are continually cutting prices. You know that a good, strong county association is what you need. Then why not address a postal card to me? Ask for my easy plans for forming branch associations. Let me know the general conditions in your county. By return mail I will send you the plans and all information regarding the formation of branch associations.

But address that postal now. Sitting idly in the shop won't give you the benefits enjoyed by smiths who have already organized. Talking it over at the store will not give the raise in prices which you desire. Action is needed. Good, brisk hustle is the only thing that ever results in anything worth while. And if anything is worth hustling for, better prices are certainly worth it. Don't hesitate, Mr. Craftsman, to start an organization movement in your county. The other smiths realize it as much as you do. The recent advances in most all supplies has cut still further into the profits of the smith. Why not organize, raise your prices and get what belongs to you? Start the movement in your county. I will give you every help and assistance; supply you with literature, call your meetings and do all in my power to form a healthy, growing association in your county. But write me today. It will take but a minute to address a postal to The American Association of Blacksmiths and Horseshoers, P. O. Box 974, Buffalo, N. Y., so why not do it now, before you lay this paper aside and forget. It will cost you but one penny, and the results may mean many, many times this amount. Will you do it now?

THE SECRETARY.

System in the Smith Shop.

Page after page has been written by experts and others on system in business, but somehow the system habit has failed to strike some smith shops. True, there are shops run on as systematic a basis as can be found anywhere, but as a general thing system is a stranger in the business end of the smithing craft.

The smith as well as the large manufacturer should know what his costs are. He should know just how much profit he makes on every piece of work that leaves the shop. He should bill his customers regularly and have their accounts in such condition always as to be able to tell exactly what they owe at any time. But this cannot be accomplished by any spindle-pin arrangement. Something modern, savoring less of the Tom Tardy system of business management, must be installed. Card systems can be easily and cheaply installed thesda ys, and there is no excuse for the happy-go-lucky systems sometimes found in the smithy. Every job that goes through your shop should be carefully followed through all hands. Every man should enter his time on the ticket which accompanies each job. He should tell what material was used and everything else that has a bearing on the profit end of the business. Every piece of work done in the shop should carry a certain percentage of the rent or taxes, fuel, insurance and other running expenses.

Whatever your system be, let it be thorough, but have it free from time-killing details which are unnecessary. Have it working uniformly in all departments, so that if the paint shop isn't paying you will know why. Don't allow one department to absorb the profits of another. Too many shops today are run on this plan with the owner puzzled to know wherein the losses occur, and this only for lack of system. Keep close track of each job from the time it enters to the time it leaves the shop, and be in touch with every part of your business. Know your business thoroughly from A to Z by installing a good system, and you will not go far astray on the profit end.

The New Engineering Building of the University of Pennsylvania.

The opening of the new building for the engineering departments of the University of Pennsylvania is an epoch in the history of engineering education in America. Six foreign governments appointed representatives to attend the formal dedication on Friday, October 19, 1906, and more than one hundred American scientific institutions and universities named delegates. Mr. Frederick W. Taylor, the president of the Society of American Mechanical Engineers, and Dr. Alexander C. Humphreys, the president of Stevens Institute of Technology, delivered the principal addresses, and Provost Harrison conferred honorary degrees upon twelve distinguished engineers.

The building is the largest of the seventy buildings now occupied by the University of Pennsylvania, having a frontage of 300 feet and a depth of 210 feet. The cost, including equipment, was almost one million dollars. It is of fire-proof construction, and the equipment is of the most modern and approved type. There are three stories, with a basement covering a third of the entire building, the total floor area being 128,000 square feet. The heating is by direct steam; the ventilation by electrically driven fans, and the lighting by electricity. The steam for the engines is supplied from the central station of the University, and after being used by the engines is sent into the heating system of the building. The basement contains locker rooms, lavatories, machinery for heating and ventilating, storage battery rooms, laboratories for geodetic and hydraulic work, and for the testing of the materials of construction. On the first floor, adjacent to the main entrance, are the offices of the heads of departments, the eastern part of the building being devoted entirely to the civil engineering department, and the western part to the mechanical engineering department. Accommodation is also provided for physical and hydraulic testing, instrument testing, and for special work in mechanical and electrical engineering. Rooms are likewise set aside for dyna-

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mos and electric motors, steam and gas engines, refrigerating apparatus, hydraulic motors, boiler testing, pattern making, foundry and machine shops, etc. Here is also located the forge room containing a most modern equipment. On the second floor is a reference library and reading room, a students' assembly room, rooms for use of instructors and for lectures and recitations. The rear portion of this floor is devoted almost wholly to drawing rooms. A room for the use of the engineering societies, a general supply store, and the library stack occupy the middle portion.

The Engineering Department of the University was established in 1874, but the constant increase of numbers in the classes of the departments has necessitated their moving into more spacious quarters three times since their founding. The departments this year have a total enrollment of nearly six hundred students, and a teaching force of forty. The new quarters which will be occupied this fall are believed to be the finest and most complete laboratories of their kind for instruction in engineering.



An easy and quick method of softening steel or annealing it is to cover the piece with tallow, heat to a cherry red in a charcoal fire and allow it to cool slowly. Another method is to cover the piece with clay, heat to cherry red in charcoal and allow to cool. W.

When working high speed steels smiths sometimes become careless. They think that because a high heat is necessary for good results when hardening, almost any heat will do when forging. This is of course a mistake as the steel is very sensitive but requires a high heat when hardening to give it the desired cutting qualities. E. M.

To use the old bone employed in case hardening, separate it from the work and dry it thoroughly. It will then be black. This can now be used by mixing it with new bone, at about one part new to two of old. It should not, however, be used for very large work. Constant burning will turn the bone white, when it should be discarded for case hardening as it is of no value whatever. J. V. W.

For the purpose of distinguishing wrought and cast-iron from steel, produce a bright surface on the piece by polishing and apply a drop of nitric acid. Allow this to remain for a minute or two, then remove with water. If the metal is wrought-iron the spot will look pale, ashy gray, if steel, a brownish black, and if cast-iron, it will be deep black. This difference is produced by the varying proportion of carbon contained in the metals. X. PERT.

When extra work is required of a tool, that is, cut hard stock, or run at a higher speed than ordinarily, it is advisable to get a steel having a greater percentage of carbon than the steel used for tools for ordinary work. When high carbon steel is purchased, it should be carefully and distinctly marked and kept separate from the other stock. For should the brands, makes, and grades become mixed without any distinguishing marks of any kind the steel worker is not very liable to get good results. Different steels need different treatment, and no amount of guess work will make up for a lack of knowledge in the quality and grade to be considered. A. S W

Welding and the Principles Governing it.

C. B. O.

The process of joining two pieces of metal so that the resulting union or joint forms one solid piece is called welding. The process as understood generally is to heat the two pieces of metal, place them together and hammer or pound them into one piece.

Practically the only thing preventing the ready and easy union of the pieces of metal is oxidation. This is caused by heating the iron in air. As the iron absorbs oxygen from the air a scale is formed called oxide of iron. This oxide is what prevents the ready union of the pieces, and it is therefore necessary to prevent the formation of the oxide before a perfect weld or joint can be made. This condition is usually sought by the use of fluxes, commonly and ofttimes erroneously called welding compounds. The fluxes either prevent the formation of the oxide or form with it a liquid mixture, which, in the latter case, is easily squeezed out between the two pieces of metal to be joined and leaves their surfaces clean when being welded. The fluxes to be used must of course contain no oxygen, and they must become fluid at a lower heat than that at which the metal is weldable. They must also be not so easily fusible as to run off the surface of the metal before the latter has reached a welding heat.

The fluxes most commonly used are sand and borax. The sand as used on iron should be clean and sharp. Borax is generally used in the condition known as calcined borax. This is made by heating the borax in an iron kettle and evaporating the water. It is then allowed to cool and then powdered. Borax treated in this manner is also used in combination with other substances such as sal ammoniac, dry clay and carbonate of potash. In the sal ammoniac combination, two parts of borax are used to one of sal ammoniac.

Oxidation may also be greatly reduced if not entirely prevented by a proper use of the blast and a good fire. It is evident that the less oxygen that comes into contact with the metal the less oxide will form. It therefore follows that if the oxygen were burned out of the air before the latter reached the heated metal, no oxide would form. We therefore build a deep fire; one with plenty of good live coals over the tuyeres, and blow just sufficient air into the fire to cause perfect combustion. The fire should also be well banked and be rather of the hollow type than that known as an open fire.

Hardening and Tempering Steel.—13.

E. R. MARKHAM.

Alloy Steels.

A number of years ago Mushet, an Englishman, found that by adding tungsten to steel he could produce a steel that would stand when speeds were increased. The peculiarity of this steel was that when heated red hot and allowed to cool in the air, it was extremely hard, but if heated red hot and plunged in water it would crack. It would also stand up under higher speeds than similar tools made from regular carbon steel and heated and hardened in water.

For roughing purposes this steel proved very valuable and was extensively used. But for finishing or where the tools must hold a fine cutting edge it never proved satisfactory. The steel manufacturers, therefore, to answer the call of machine shop managers for a steel that would stand higher speeds than the air hardened steels, succeeded by the addition of a certain percentage

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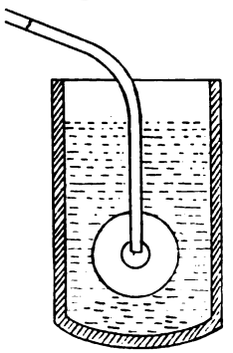
of chromium, and increasing the amount of tungsten, in producing a steel that allowed of much higher speeds that had ever been anticipated even by the most sanguine.

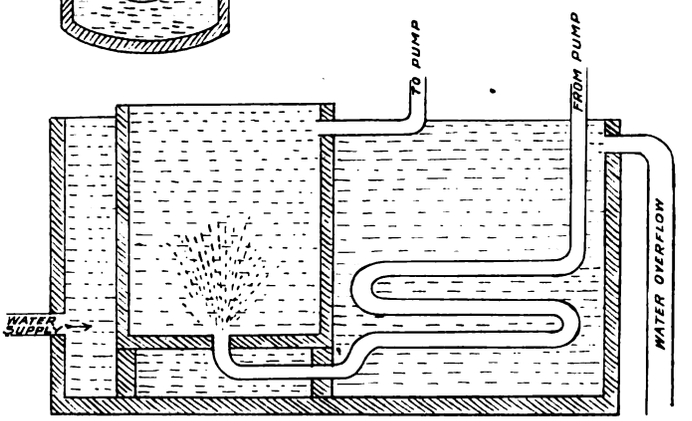
While most of the high speed steels that have come to the writer's attention depended for their peculiar qualities on the presence of tungsten and chromium, yet certain makes have other things in combination, and as a rule these steels require different treatment. An analysis of a standard make of this steel showed that it contained the following elements: carbon 0.55 per cent., chromium 3.5 per cent., tungsten 13.5 per cent. The various makes of this steel require different treatment, but it is safe to say that the steel when forged must be heated hot enough to make it soft enough to work under the hammer.

While certain forms of tools may be made sufficiently hard by heating red hot and allowing to cool off by lying in still air, yet for most purposes it is desirable to bring out the high speed qualities of this steel, and this is generally accomplished by heating to extremely high heats and then cooling as rapidly as possible without injuring the steel. There are several makes of this steel, however, which do not require the high heats mentioned, but they are decidedly in the minority.

The heat necessary to bring out the cutting qualities of this steel is generally described as a "white heat" or a "dazzling white heat." It is safe to say, however, that most of them must be heated nearly to the point of melting, especially on the portion that is to do the cutting. A very satisfactory fire for use in heating this steel is a good clean coke fire, or one of a good quality of coal well coked. The method of heating, however, differs for different classes of tools. When we are to harden a lathe or planer tool of ordinary form it may be heated until the end apparently commences to fuse, when it may be removed and held in a strong air blast. Many fail to get best results by placing the tool to be hardened too close to the nozzle of blast. It should be held 6 or 7 inches away. If an air blast of sufficient size and strength is not available, the tool may be dipped in oil; fish or lard oil will do, while for certain heavy tools many use kerosene. I do not advocate its use, however, as the operator is apt to be badly burned unless very skilful, it being necessary to immerse the whole tool in the oil as quickly as possible to prevent the surface catching fire. The tool should be held by some form of tongs, or other holding device that is so formed as to do away with any liability of burning the operator.

When tools are such that it would not do to heat them exposed to the air, it is necessary to provide some means whereby they may be heated without oxidizing the surface. This is some times accomplished by heating in a crucible of lead heated to a white heat. Special furnaces which burn gas are generally very satisfactory, as the steel not coming in contact with the air does not oxidize, and any irregular shaped tools which would be ruined by oxidation of the surface may be safely heated in them. While a crucible of lead heated to a white heat provides a medium in which such tools as taps, irregular shaped cutters, formed tools, and tools of similar character may be heated, unsatisfactory results follow unless extreme care is observed. The lead being extremely hot, it would be dangerous, so far as the tool is concerned, to plunge cold steel into it, as the extreme heat would cause the surface to expand very rapidly and out of proportion to the interior, and as a result the steel would crack. Consequently it is necessary to heat the articles to a red in the fire. They may then be plunged in the crucible of lead with safety. It is necessary to hold the piece, being heated, beneath the surface of the lead, as the steel, being lighter than the lead, would float, and the part exposed to the air would oxidize to a degree which in many cases would prove disastrous. In order that the tool being heated may be held below the surface of the lead, a hook made of iron or low grade steel wire may be used. This wire should be bent as shown in Fig. 1 in order that the hand may not be exposed to the terrific heat of the fire and lead. To prevent the wire melting or oxidizing too rapidly, the lower end is covered with fire clay or a mixture of fire clay and asbestos. To prevent this covering from breaking away from the wire hook, it may be wound with fine iron binding wire. This is sunk below the surface of the clay, and being covered by it is not readily burned. The intense heat to which the lead is subjected causes the surface to oxidize rapidly. This may be prevented in a measure by keeping the surface of the lead covered with charcoal. This dross on the surface of the lead must also be skimmed off or pushed to one side when the heated tool is drawn through the surface, or it will stick to the steel and prevent its hardening at this point, or at least it will not be as hard as when the oil in the bath has free access to it. It is apparent that tools whose character is such that heating them exposed to the air would injure them, should not be cooled by exposing them to an air blast. Such tools must be dipped in oil.





FIGS. 1 AND 2



FIG. 3



FIG. 4



FIG. 5

Very large tools are often heated by building an oven of fire brick, then building around and over this a fire of coke. With sufficient blast an extremely hot, uniform fire may be maintained for a length of time that insures a uniformly heated piece of steel. This is then removed and the steel instantly

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plunged into a tank of oil of generous proportions.

In shops where but a few small pieces are to be hardened at a time, a still bath of oil answers the purpose. But if many pieces are to be hardened it is necessary to provide some means of keeping the oil cool. A tank holding the oil may be placed in a larger tank holding water. A pump draws the oil from near the surface of the bath, as shown in Fig. 2, and pumps it through the coil in the water, and the cooled oil re-enters the bath at the bottom, as shown. Certain classes of tools made from some of the high speed steels may be hardened in hot water, and such tools as shank milling machine cutters, taps and similar articles are many times treated this way. But unless the operator has had experience along these lines it would be unwise for him to use a bath of anything but oil.

The introduction of this steel has entirely revolutionized many machine shop operations and has decreased costs from 50 to 200 per cent. Extravagant claims are many for this steel, claims that are never realized, and, as a consequence, mechanics and manufacturers are at times disappointed when they fail to realize all they expected. Nevertheless, a greater amount of work may be turned out by the use of these steels than if ordinary carbon tool steel were used.

High speed steel to be machined must also be annealed. But, as the steel manufacturer sells it in this condition at the additional price of but five cents a pound, it is folly to think of annealing it in the shop having only the ordinary equipment. Nevertheless, there are times when it seems desirable to anneal it, thus doing away with the necessary delay incident to waiting for a shipment from the mill or steel house.

The steel should be packed in an iron box, using as packing material, something that will exclude the air as much as possible. I have best success with packing in dry fire clay. Others claim good results from lime, while some use a mixture of finely powdered charcoal and lime. The steel must be heated hotter and allowed to remain hot for a longer period than if carbon tool steel was being treated.

Several of the steels work nicely if heated to a high yellow heat, and then allowed to remain in this condition for several hours. They are then slowly cooled in the furnace until below a red heat, when they may be removed from the furnace and allowed to cool in the air, the steel being left in the box until it has become cold.



A GENERAL SHOP OF THE SOUTH

When tools for use in the lathe, or planer are made from the *unannealed* bar, they are liable to break in the tool-post. To do away with this tendency, the bar may be annealed, the tool cut from it, forged and the cutting end hardened. The portion that goes in the tool-post will not be brittle, and consequently will not break when in use.

As the price of this steel exceeds by several times the price of ordinary tool-steel, many tools are made from machine steel, or cast-iron, and cutting teeth of high speed steel are inserted. Fig. 3 shows a milling machine cutter whose body is of cast-iron and the teeth of this steel. It has all the advantages of a cutter made entirely from the steel. Yet the cost of the complete tool is comparatively low.

Blacksmiths many times make the mistake of attempting to treat ordinary tool steel immediately after hardening high speed steel, and as a result of the condition of their eyes, overheat the steel. When treating high speed steel the smith will find ample opportunity of using his brains, as despite any attempt at instructions, it will be found necessary to use judgment when handling the various tools. As, for instance, a tool having comparatively delicate portions as an ordinary milling machine cutter of the type shown in Fig. 4, or the tap shown in Fig. 5. Either tool must be heated in a manner to remove it from the action of the air. When it has reached the desired temperature it may be plunged in oil and hardened. As the cutting portions are slender, and consequently comparatively weak, it is necessary to reduce the brittleness. This is done by drawing the temper to a straw color in the case of the milling cutter, and perhaps lower for the tap. The shank of the tap should be heated red hot in a crucible of red hot lead and then buried in a box of lime to cool slowly.

In order to cover the ground thoroughly it would be necessary to describe every form of tool made from every brand of high-speed steel, and then vary the treatment to suit different conditions. So it seems wise to close with the remark that the blacksmith must acquaint himself with the nature and peculiarities of the steel and then adapt the treatment to the case in hand.

(*To be continued*).

A Southern Smith Shop.

D. F. THAXTON.

The accompanying picture shows my smith shop, which is built entirely of brick, and is 34 feet by 46 feet. I have two forges, employ two horseshoers, and shoe from 6 to 20 horses a day. I also employ a wood worker. We do a general smithing business.

Our prices here are low:

Four shoes	$ .75
Wagon Rims	1.50
Buggy Rims	1.25
Spokes, each	.15

You can see that I work cheap. I have been in this shop since 1891.

Thornton's Letters.—2.

Being "Straight-from-the-shoulder" Talk from a Prosperous Selfmade Smith to his Former Apprentice now in Business.

DEAR JIM:

Of course you want a side line if you don't get enough business to keep you busy—that's what a side-line's for—to help out. But you are the only chap who can say what line. I don't know your locality—your customers—the needs of the people. You know this—all you need do is to use this knowledge. Give the people what they want. Don't take up any line because it promises big returns—look on the demand side of the question. If this is strong enough, the profit side will take care of itself. Keep good goods. Price appeals to the purse but it doesn't bring a re-order. Quality does that, and quality is the thing to talk. You know what quality means at Thornton's. Give it

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the same meaning at your shop. Talk, speak, preach, recommend, and yell *Quality* today, tomorrow and always. Make quality and your shop and work mean the same thing. If necessary to handle any cheap lines don't misrepresent them—tell your customers just what they're getting. Don't say that the 25-cent tin buckets are as good as the dollar-and-a-quarter-galvanized iron ones because you haven't got any of the dollar-and-a-quarter kind. If you sell a cheap bucket tell your customer you can guarantee it—but for short service only. When you sell an article of quality, tell the truth about that also. But not in such a way as to allow the customer's imagination to carry the quality of the article to the skies. Better to surprise the customer a bit with the actual staying qualities of the article than to disappoint him by overestimating its good points. I just speak of this to impress upon you the necessity of square dealing. People don't as a rule "have it in for" the chap who deals square. Get people to talk of you as "Honest Jim Hollis." I know it isn't the modern business man's idea of things, but take this tip now and get busy on it immediately: Don't be afraid to be alone in your thoughts, deeds, ideas and convictions. The crowd isn't always on the right side of the fence. It's usually the reverse. Don't follow the crowd in any thing. Don't be a tail—be the head, the leader always. But don't be stubborn and "want to be leader or nothing," as a chap at school used to say when we played "Follow-the-leader." Hardly necessary to say that he was usually "nothing." It's all right to want to lead—it's commendable, but don't try to be the "hul ting" all the time. There's a difference, and you want to guard against overstepping the boundary from one to the other.

You have a place to make for yourself up there, Jim. See that you make it good and big, and that you fill it. Takes a big man to fill a big place and not have the filling rattle. See that no sound comes from your place at any time. It won't if you grow and broaden as you should. And I want you to be lazy, Jim. Lazy enough to stay right where you are and dissatisfied enough with your condition and trade to put forth every effort to betterment and increased trade. Since you've been located I've looked into things at your town. Brown, the Emerson horse-nail man, tells me that the town, while not having an air-ship boom, has a good future. This is good news, Jim, and while it's not well to gamble on futures it's well to know that things are more likely to improve than to go the reverse. So stick, Jim, and don't allow any amount of hard luck to discourage you. Of course if the unexpected should happen, don't hang on till the last dog is hung. Keep your finger on the pulse of things up there, Jim. Keep your eyes and ears wide open. Not that anything is very likely to happen, but I don't want you to be caught napping. Yours,

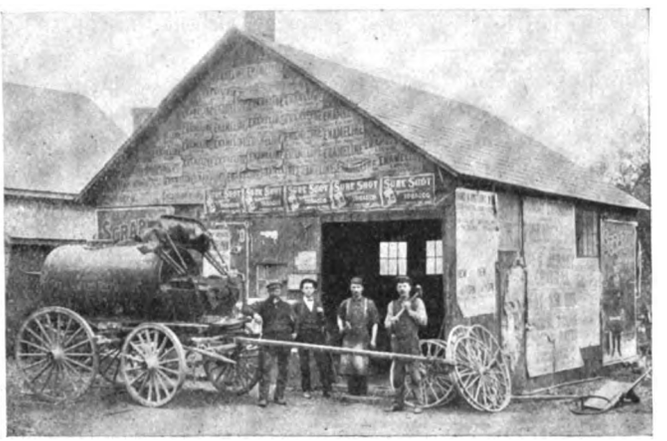
THORNTON.

A Pennsylvania Shop and Some Prices.

C. B. GEIGER.

The accompanying engraving shows an exterior view of my smith shop. It is 25 feet square. My equipment consists of one blower, one bellows, two vises, two Peter Wright anvils, one tire bender, one tire shrinker, one drill press, one home-made foot-power drill press, besides many small tools. My prices are as follows:

Four new shoes	$1.25
Hand-made shoes	2.50
Toe or side weight shoes	1.50
Four old shoes	.50



A PENNSYLVANIA SMITH SHOP

One old shoe	.15
Four new buggy tires	4.00
Four tires reset	1.50
One roughing brake shoe	3.00
Sharpening small tools, per point	.04
Hoes sharpened	.10
Axes sharpened	.25

Our prices on other work are arranged in proportion to these.

It is interesting to note the varied prices demanded in different localities. In some places they are absurdly low, in other sections very fair, but when a good smith stands up for his rights, the customer will pay the price.

Dont's for the Craft.—6.

For the Wheelwright.

L. O. MONSON.

Don't knock the other fellow.

Don't fail to set spokes in good hot glue.

Don't use a screw driver to cut off bolts.

Don't have your fire low over the tuyere.

Don't use a sharp fuller to stretch the tire.

Don't cut your stock for a new tire too short.

Don't mark your wheel and tire on the outside.

Don't use poor stock and expect best results.

Don't talk against modern tools and shop equipment.

Don't forget that care never spoiled a tire nor a wheel.

Don't fail to give the apprentice a chance to learn.

Don't spend more time on a job than it is worth.

Don't show your prejudices against labor saving tools.

Don't say "It's now as good as new," unless you mean it.

Don't forget that a wheel is painted to preserve the wood.

Don't use anything but a tire-wheel on a tire or wheel.

Don't use the dividers if you want to do accurate work.

Don't forget that a tire bolter will do the work quicker.

Don't think that all other wheel-wrights have "wheels."

Don't attempt to drive a spoke past the rivet in a sarven hub.

Don't try to set a tire without marking both tire and wheel.

Don't try to repair a sarven wheel without removing the rivets.

Don't mar the felloe as much as you can when repairing a wheel.

Don't cut off the edges of the weld to make it of uniform width.

Don't screw the tire bolt nuts so they cut deeply into the wood.

Don't ever say "that's near enough" when measuring tire or wheel.

Don't try to economise by using the old rivets in a sarven hub.

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Don't be afraid to satisfy your customer with good, honest work.

Don't think that you know all there is to be known about vehicles.

Don't try any tire-welding stunts with anything but a good, clean fire.

Don't do a thing a certain way just because your father did it that way.

Don't be so short sighted as to "fix" a job so it will come to the shop often.

Don't go at riveting a sarven hub as though you were working on a boiler.

Don't spend a quarter's worth of time to save five cents worth of tire bolts.

Don't forget that a reputation for honest work neatly done means money to you.

Don't promise a job at a certain time unless you can live up to your promise.

Don't forget that it's possible to lose money on a job by putting a lot of extras on it.

Don't forget to allow from two to three inches when cutting stock for new tires.

Don't think that nobody else can find out what you know about wheels and things.

Don't forget that a wide fuller will stretch a tire without cutting and weakening it.

Don't try to save time in drilling a tire and waste an hour because you broke the drill.

Don't think that you're a wheelwright simply because the sign over the door says so.

Don't forget that it's better to have the hub boxing bear at the ends than its entire length.

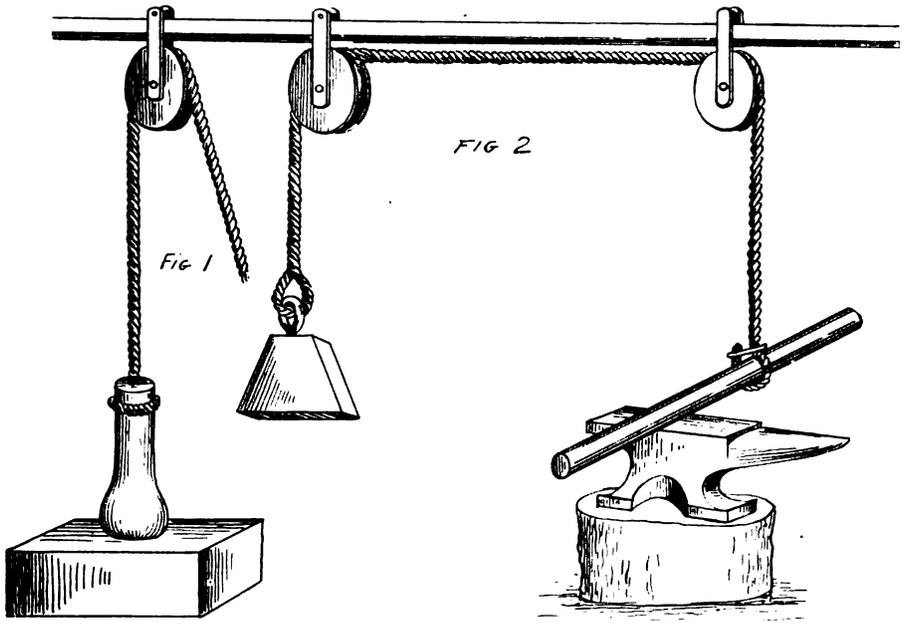
Don't cover a defective job with paint and expect that use will not "show-up" the deception.

Don't forget that anything that will shorten the time a job is in the shop increases your profits.

Don't condemn all cold-tire setters because you have seen one go wrong in the hands of Tom Careless.

Don't think that because you've done a thing a certain way for ten or twenty years it is correct or the best way.

Don't forget that five minutes taken in running the tire and wheel will mean ten minutes saved in fitting and doing good work.



HANDY DEVICES FOR THE SMITH SHOP

Several Shop-Made Tools and Appliances.

MICHAEL BREEN.

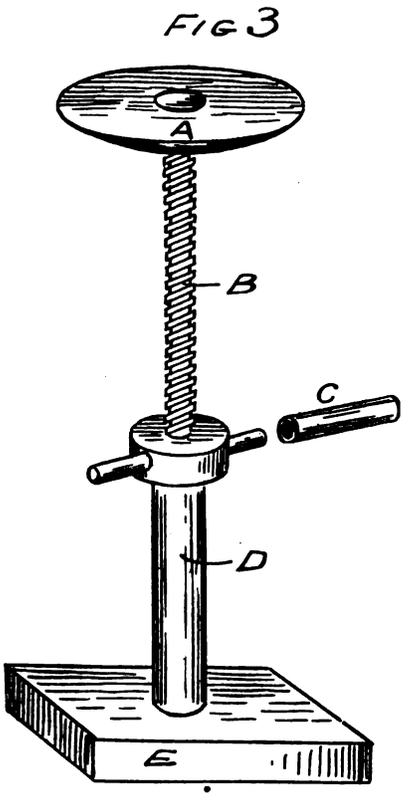
(Prize Contest).

The several devices illustrated are all very useful in the smith-shop and can be made by any smith with little or no outlay.

Figure 1 shows an appliance for upsetting heavy bars, which is very handy and useful where such work is to be done. It consists of a rope passing over a pulley suspended from some convenient position. The work is first made fast to one end by a ring and noose and can be adjusted instantaneously. It is then heated at the required place, hoisted by means of the rope, and is then let fall on a swage block, old anvil, or any other metal block until upset to the desired size.

Figure 2 is a handy billy or hold-up. This consists of two pulleys over which a rope is passed. A weight on one end of the rope counterbalances the work to be held up. It is a very handy appliance, as work can be so easily manipulated with it and the slightest lift adjusts it on the anvil.

Figure 3 is a handy jack. This is a very useful tool and can be used for so many things. You can jack up a carriage, trap, wagon, van, or cart with it, or it can be used as a stock holder at the anvil. The screw and nut may also be used for drawing the bushes out of wheels. It can also be inserted in the wheel platform and used to screw down wheels, to take out dish, or to put in dish. It is made very simply; B is a screw with nut, collar, and cotter hole in it; A is a piece of timber which rests upon the collar and acts as a head; E is a block of wood which acts as a base; D is a tube inserted to E and takes the



A JACK VERY SIMPLE TO MAKE AND ADAPTED TO MANY USES

screw B. You can put in any length of tube to suit the height. C is a piece of pipe that acts as a handle on the nut.

Figure 4 is a handy appliance for setting axles. It consists of two straight pieces of timber, C C, to which the bushes B B are affixed by means of bolts and short pieces of timber which are notched to receive bushes. The bushes

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are put in their respective arms when clamped. They revolve and are adjusted until brought square to the axle line. They are then tightened up to hold their position. When measured diagonally, it proves whether the axle is in line or not, and whether the creep is the same in both arms.

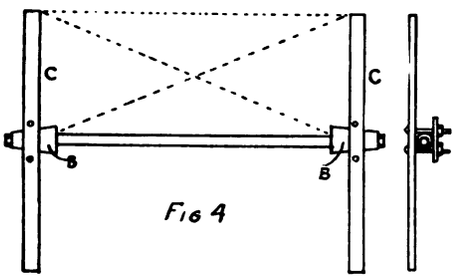
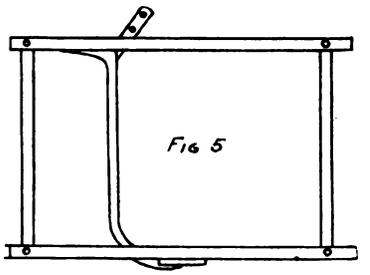


Fig 4

APPLIANCE FOR SETTING AXLES


Fig 5

A PARALLELOGRAM

Figure 5 is a parallelogram. This contrivance is so useful that I consider no shop fully equipped without it. It is so very simple to make that the apprentice on his first day should be able to construct one. It is made of four pieces of hoop iron. A handy size is 1¼ by ⅛-inch. The device should be about 2 feet long and 18 or 20 inches wide according to the work you use it for. It will, however, do no harm to have it large as you can close it up to any size. Bore a rivet hole in each end of each piece and make each pair accurate in length. The best and simplest plan is to run the bit through each pair together, and put a rivet in one end while you are boring the other. I never saw the tool in any shop or ever heard tell of it. But I made one for myself and recommend it to anyone who has work to do in which two parts must be parallel to each other, such as a step, for which it is invaluable.

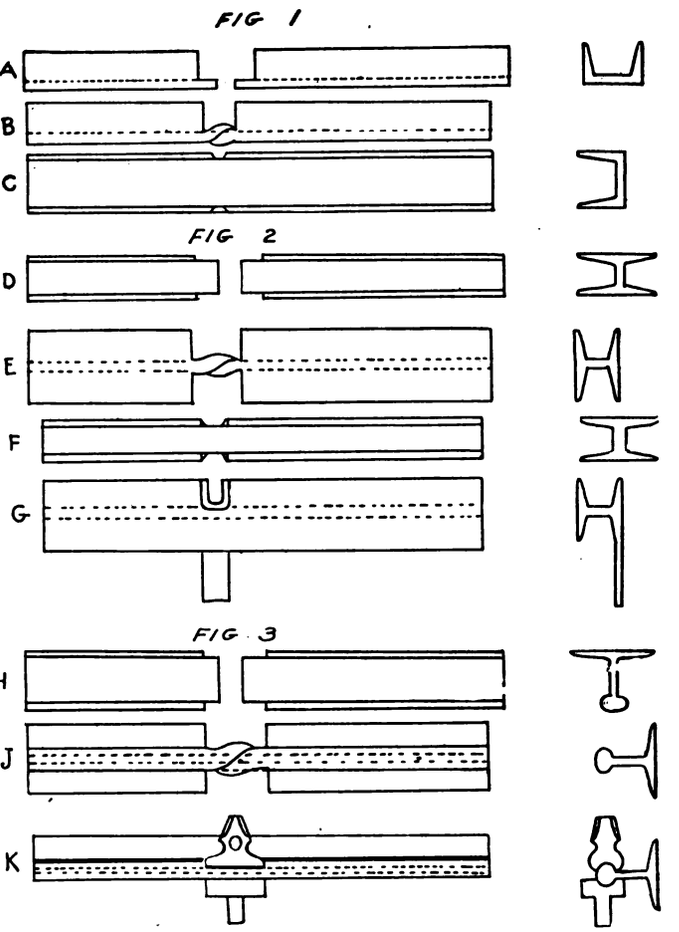
Scarfing and Welding Channels and T-Bars.

C. H. RICHARDSON.

Only on rare occasions are blacksmiths required to weld Z-bars, or eye beams, but very frequently are they called upon to weld together short bars of channel, bulb-edge T and I bars. It is my intention in this article to lay down a rule that will apply to any of the irregular shapes used in structural iron work, and one of the great difficulties met with when welding bars of this type is to prevent the flanges from heating before the point to be welded is effected by the fire.

The plan I wish to formulate is: at all times weld all of these different styles as if they were ordinary bar stock. That is, cut the flanges away so there will be only enough of the bar projecting to allow for a good lap and weld. If care is taken the flange will be quite close together after the weld is made. This is so when they are scarfed for welding and two edges will meet as shown at C, Fig. 1. The filling-in-piece should be good iron, the thickness of the flange, and the width of the lap. This stock should not be scarfed. The reason for not doing so is because, when the separate heats are taken, the iron being so much softer than the steel the former works into the latter, leaving a good solid job with no thin scarfs to weld later on. Fig. 1 illustrates the different steps for scarfing and welding the channel bar. The I bar in Fig. 2 progresses in the same manner as the channel, varying slightly while the flanges are being welded on, as shown at G. Instead of welding the filling-in-piece all the distance across the flange, it has been proven that the best plan is to let the stock run only to the centre or the web of the bar. Finish one side at a time, as shown. The filling-in-piece is now in place and is ready to be cut off flush and dressed up to size. The different steps to be taken for bulb-edge T-bars are shown in Fig. 3. It is, I think, thoroughly understood that the bulb-edge is cut away as well as the flange in this case.

Last, but not least, comes the Z-bar. The scarfing and welding of this is worked out in the same manner as the foregoing styles.



THE SEVERAL STEPS IN SCARFING AND WELDING CHANNELS AND T-BARS

Repairing Engine Frames by the Thermit Process.

GEO. KELLY.

It has been stated that Thermit welding is not properly blacksmith work, but is rather a foundry process. In many cases, however, general repair shops have no foundry, when the work naturally devolves upon the smith department. If any here are so situated this paper may be of some profit to them.

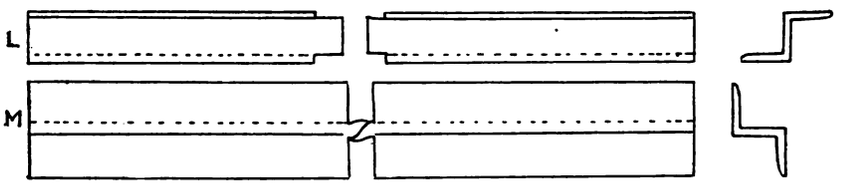
It will not be necessary to give the general methods of procedure with Thermit, as this information can be had in circular form from the manufacturers, and is more or less familiar to all master blacksmiths, but a few words to detail the making of the mould, drying and applying the frame.

The man who makes the mould should be thoroughly familiar with the instruc-

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tions. The sand and clay should be thoroughly mixed and stiff, experience having proved that the less moisture at the time of making the mould the better the fit after drying. A mould should remain at least from six to eight hours in the furnace at a low heat. Place one or two wires in the heavy part of the mould, so that they may be drawn out after drying, as a test that there is absolutely no moisture. After the paint and grease is removed, apply the mould at once, all joints being carefully luted with moist clay. To heat the frame to a red heat, apply an ordinary gasolene frame heater down the riser opening of the mould. The bottom of this opening can be made larger in proportion to the size of the collar applied.

FIG 4



SCARFING AND WELDING Z-BARS

During the heating of the frame the crucible can be charged. After a couple of reactions the bottom of the crucible becomes enlarged, and it is necessary to use more plugging material than the manufacturers apply in order to avoid premature tapping.

In addition to one charge of material we use the crushed light slag that comes from the previous heats, and this answers the same purpose as the refractory sand.

Have crucible, Thermit, tapping material and punchings warm. Be ready, and as soon as the frame is red hot, which can be seen by looking through the pouring gate of the mould, start the Thermit; and when the liquid steel has settled in the bottom of the crucible, it is then tapped, allowing the steel to enter the mould at 5,400 degrees of heat.

In preparing the break for the weld, the method we have found met with the best results is to drill ¾-inch holes through the break, following the line of the fracture, and a 1-inch hole in each side, midway and tangent to the ¾-inch holes, already drilled. It is understood that the frame is spread before the mould is applied. If possible, when a collar or band of Thermit, 6 or 7 inches wide and 1 inch thick, is applied around the break, the frame should spread at least 1/16 of an inch.

From 15 to 20 seconds after the weld is made the jack should be released to allow the frame to come together ¼ of an inch, and holding it apart 3/16 of an inch until the Thermit has become set. Then remove the jack and let the frame resume its normal position. An instance is here given to show the results of this method. A break occurred on an Atlantic type engine through the back of the frame at the junction of one of the rear pedestals. A collar of Thermit, 7½ inches by 1¼ inches was made about the break, and after the crucible was tapped and the mould filled the frame was immediately allowed to come together within 3/16 of an inch of the original length. About one hour afterwards the jack was removed, but the frame showed no sign of shortening to original length, until two hours from time weld was made, the heat running along the frame from 2½ to 3 feet each side of the mould. After the frame was cold it was found by tramming that the frame was 3/16 of an inch longer than the original tram marks.

The writer believes a number of failures with the Thermit process are due to the fact that the operator does not allow enough for contraction.

The question which no doubt is now foremost in all minds is: "What results have followed the use of Thermit?" From Jan. 14, 1905, to June 14, 1906, a period of seventeen months, welds were made as follows:

Thirty-three were made on engine frames, which are now in service, fourteen being over driving boxes. Of the above number six were rewelded, after being in service from three to 12 months, five of these being over driving box. These frames are all wrought iron with but one exception, same being of cast steel and was broken in a wreck.

In addition to these welds, five frames welded over right front driving box (engine lead on right side) were broken in service, rewelded and broken again, as the location of fracture or break being such as not to permit a permanent collar of Thermit to remain. When the engines were taken into shop after second weld broke, section was cut out and reinforced with a new section of wrought iron. Four of them were reinforced in this manner, while the other one was replaced with a steel section, same being welded to the wrought iron frame with Thermit.

Sixteen welds were made on cast steel driving wheels, all of which are still in service, and one weld on cast steel ferry boat casting.

In conclusion it may be stated, to obtain results from the Thermit process, one cannot be a pessimist. Many are inclined to be skeptical, inasmuch as this method is such a radical departure from the regular lines; however, in the advance of science, new processes confront us and we must ever grant a fair trial before condemnation.

Classification of Work in the Shop.

W. J. MAYER.*

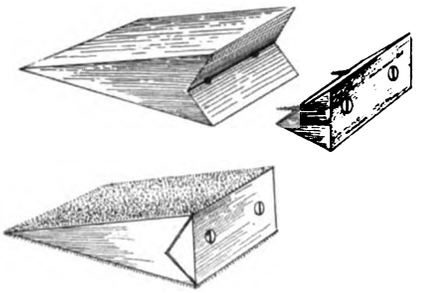
When this subject was first proposed at our meeting last year, the thought was expressed that classification would tend to make specialists. This has been uppermost in my mind since seeing my name as chairman on this Committee. I would, therefore, with your permission, change the wording of the text just a little, or, in other words, suit the caption to my thoughts.

Specializing work in the shop. This is not a new subject. There is scarcely a foreman in any department who has not given this subject more or less thought and attention. You will likewise rarely find a shop where this is not practiced in a greater or less degree. We all have our specialists on tools, springs, motion work and frame work, to say nothing about upsetting machines, bolt headers, etc. The hammersmith or belt hammer men I consider in a class by themselves, but also specialists. Specializing work is all very well in a shop where you have from 20 to 30, or possibly 40, fires. In a shop of this size specializing can be made a science—for you can have a fire for each kind of work, the forge can also be built and all tools made and arranged for each particular class of work, making the conditions as near perfect as possible, thereby increasing your output considerably. The old adage of "Practice makes perfect" is true, likewise the more often a man performs a certain duty the more proficient he becomes. But how about the shop where you have only four or five fires, and we have about as many of this size as of the larger ones,

*Read before the I. R. M. B. A. convention at Chicago.

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and the same class of work is done as in the large shop, only in lesser quantities. You may think I am taking both sides of the question at the same time,



A CONVENIENT SAND-PAPER BLOCK

but I believe we should not lose sight of the smaller shop. I do not conceive how a shop with 4 or 5 fires can be run on just the same principle as one with 30 or 40. I contend that specializing can, and should be practiced to the fullest extent where circumstances warrant it. We find this the rule in all professions for have we not the specialist in the medical profession, and many others? Now, if the specialist is a success in the professions, why not in the trades? This might be qualified for a specialist may be a success in a large city but a failure as a specialist in a village. The good old family doctor who can cure a headache, but can also saw off a leg if the occasion demands, is the proper man for a village. So the specialist in a large shop is the man you want, but give me the good all around man in a small shop, who can not only repair an old chain but can also make side rods, equalizers or frames if necessary. We often find that we have a large quantity of a certain kind of work which must be delivered just as soon as possible. At such times it is well to have more than one or possibly two men who are familiar with the work.

In my opinion there is nothing like piece work to make specialists of your men, for if a man knows that sooner or later he will have certain jobs coming his way, he will observe the other fellow and see how he does it, and possibly improve on his method; for the old saying that "two heads are better than one" will hold good in this respect, and I would add that if "two heads are better than one" three are still better.

A Holder for Sand-Paper.

A. C. SMALLEY.

Sand-paper as generally used by the wood worker is wasted and with a view to economy and convenience we use a block such as shown in the accompanying engraving. Sand-paper usually comes in sheets nine by eleven inches in size and this was the basis upon which we figured the dimensions of our holder. If you are using the 8¾ by 10½-inch paper make the holder accordingly. Secure a good piece of hardwood and cut a wedge 3 inches wide by 5¼ inches long and about one and three-quarters inches thick at the big end. The sharp end is made slightly rounding so as not to cut through the paper so rapidly. Now cut a V-shaped groove across the thick end and fit another piece of hardwood into this. This piece should fit into the groove exactly. Now screw two wood screws through this end piece and into the block. Now cut your sand-paper into strips measuring 3 inches wide by 11 inches long. You will have observed that the area of the block to be covered with sand-paper allows for ½ an inch over. Therefore insert ¼ of an inch of one end of the piece between the block and small end piece, and wind the paper around the pointed end of the wedge and insert the other end in the other side of the holder. The screws are now tightened and the block is ready for use.



The following columns are intended for the convenience of all readers for discussions upon blacksmithing, horseshoeing, carriage building and allied topics. Questions, answers and comments are solicited and are always acceptable. Names omitted and addresses supplied upon request.

Wants to Temper Mill Picks.—I would like very much for some practical craftsman to give me information on the tempering of mill picks. Will some brother kindly assist me? Z. J. MONETTE.

That Cement Floor.—I noticed that Brother Anderson asked how a cement floor will wear in a shop. I do not like it, your feet get tired rapidly, and if you drop a piece of hot iron it will blow a hole in your floor. JOHN DAHL.

Refilling Sarven Wheels.—I desire to let the readers of THE AMERICAN BLACKSMITH know that I have been filling patent Sarven wheels for the last few days, and I did the job the same old way. All the articles that I have read on the subject, haven't changed my mind at all. I just cut out the rivets, replace the spokes with new ones, and refill the hub with rivets of proper size to fill the holes in the flanges. With a small hammer I draw the rivets perfectly tight. And I didn't have a pressure of from 20 to 50 tons either. When you fill a Sarven wheel in this manner, with the proper material, properly sized and fitted, you have a job that is as good as can be done and you need not be afraid to send the job out. M. A. FOSTER.

Curing the Cross Firing Animal. — In answer to Mr. Detthenner on how to shoe a horse that cross fires; we had a horse that had been shod for three years all over the country, but none of the blacksmiths seemed to get him right. We shod him with success the first time. Pare down the front toe as much as possible and leave the hind toe as long as possible. Shoe him in front with a 16-ounce shoe with heels level with the toe. On the hind feet put 12-ounce shoes, light inside and heavy outside, with a square toe. Leave the toe stand over as much as possible. BEILENBERG & WEDING.

To Temper the Warped Twist Drills.—In reply to brother C. B. Dickey would say, the drills must first be straightened before they can be tempered. Even then I doubt whether you will find your labors repaid. The drills have probably been burned, but if not proceed as follows: Take two V blocks, place a drill between them with the concave side down and place in a straightening press. Now with a gasoline torch or Bunsen burner heat the drill where it is bent. Be careful to heat slowly and not too hot. When heated sufficiently apply the pressure of your press, and spring the drill back to shape. If the drills have been burned or twisted to such a great extent as to make their straightening very difficult, it would be best to purchase new ones. As to tempering after they are straightened, I think the usual procedure will answer the purpose very well. M. H. HOWARD.

Mixing Rough Stuff. — In reply to the reader who desired information on mixing rough stuff or filler, I recommend the following formulas: To 3 pounds of filler add one pound of keg white lead, mix together well and then reduce to a thick paste with rubbing varnish and Japan. It may then be thickened to a brushing consistency with turpentine. Another formula is to take 1½ pounds of dry white lead ground stiff in turpentine. Take 4 pounds of ochre and grind this also in turpentine. The two are now mixed and ½ pound of tub lead added. To this add 1 pint of Japan gold size and about ½ pint of the bottoms of wearing varnish. Reduce the resulting mixture with a little turpentine if necessary. This makes a very durable and elastic rough stuff.

I take it for granted that the questioner understands thoroughly the application and manipulating of rough stuff. M. C. H.

Another Item on Sarven Wheels.—I noticed in the last number of your paper a piece signed J. C. in regard to filling a Sarven wheel. He thought it didn't pay to do it, and I agree with him. I have sent many a customer away telling him that, but I have learned a better way. He may need his wagon every day and if he is

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willing to pay the price, this is the way I do it: First remove half of the rivets (every other one) and then after properly fitting all the spokes, drive eight or half of them in pairs. Then with a stout string or piece of hay wire draw them firmly together by slipping the tie up towards the end of the spoke. Now bore between and put in the rivets and head them down, after which I take out the rest of the rivets and put in the other eight spokes and finish the job. R. I. COWDEN.

Some Prices from Texas.—Not seeing any prices from this part of the country, probably some of the craft will be interested in our prices:

Horseshoeing, per set of 4	$ 1.00
Setting wagon tires	2.00
Resetting, per set of 4	.70
Setting buggy tires	2.60
Wagon and Buggy tongues	3.00
Buggy stubs	$7.50 to 9.00
Buggy reach	1.00
Wagon bolsters	2.50
New plow shoes	$2.00 to 3.50
Sharpening	.10 to .25
Pointing plows	.50 to .75

I believe in doing good work and think we ought to have good prices for it, although the prices on quite a lot of our work is far too low. C. E. MASSENGALE.

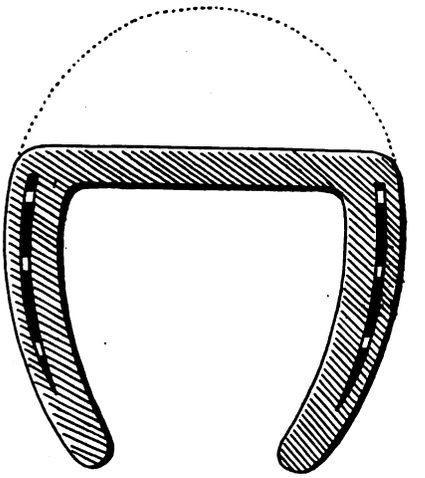
Several New Ideas on Horseshoeing.—I submit a few thoughts that I have learned in my 36 years' experience. There is a great deal said in papers and books about side-weight and toe-weight shoes. My experience is that the foot of the horse is made natural and nature does not want any extra weight on either side or front, for it is sure to throw the foot out of its natural balance. I have had experience with forging horses and interfering horses. For a forging horse, I set the toecalk on the inside web of the natural front shoe rather high with a heelcalk a little lower and set well forward on the foot. The hind shoe, is set well forward, as near level as possible, so if the horse does strike occasionally he will not cut the hind hoof. But it is very seldom he will strike. For interfering I set the toe or front part of the shoe a little out so that the horse will carry his foot out. And as he strikes the ankle of the other leg with the inside of the toe, instead of the heel, (as some writers intimate) it throws the foot farther from the ankle and consequently misses the ankle. H. B. PROSE.

Making the Spare Time Pay.—I am not able to write to your paper very often just now as I am studying for engineer and that keeps me busy every night and Sundays. I have been studying with a correspondence school now for the last fifteen months, and still have about six more months ahead of me before I can make my diploma. It takes a great deal of studying, as the school is very exact and does not let a man slip through just because he is paid up. The schooling is cheap. I payed but fifty dollars, and received all my instruction books, besides a very nice reference library of twelve volumes for that "half century." But as I have said, I have to study.

If you find a corner for this letter in "Our Journal" I should be thankful to you. It may start some young smiths to take up a course. Many young men think it is an expensive thing, but it is not, as most correspondence schools give a man ample time in which to pay up. FRANK WENKE.

A Letter From the Well-Driller.—Just now I have my machine at home and partly dismantled undergoing repairs. I am putting 32 water tubes into the fire box above the door, and as I cannot use the engine to drive the blower for my fire, I jacked up one hind wheel of the machine. This answers as a band wheel. I then set the blower on the ground, attached a handle to one of the spokes of the wheel and by connecting the blower with the wheel by means of a belt, I can generate plenty of blast for the purpose of dressing chisels, center bits, reamers, etc., which I use on the boiler and light iron work on the machine. I do not carry an anvil with my outfit but use a piece of heavy railroad rail and a five-foot piece of 1½ by 5-inch draw bar instead. I am twenty miles over two mountains from a machine shop. L. R. SWARTZ.

To Cure an Overreacher.—In reply to Wm. Walsh's inquiry in regard to stopping the horse from overreaching; he will find that the horse has a surplus amount of hoof or wall on the toe of the front foot, and the hind foot is generally the opposite. Dress the foot with the object of getting the toe as short as possible, leaving it comparitively high. Trim the hind feet leaving



THE SHOE FOR THE OVERREACHER

the toe long and heels low. Put an ordinary shoe on the hind foot with a side clip if clips are used and fit full at the toe. On the front foot put a square toe shoe, letting the toe of the hoof project from ½ to 1 inch over the shoe according to how bad the horse overreaches. It is not necessary to clip the front shoes. These shoes are easily squared in the toe by heating the shoe in the toe and put it over the horn of anvil. Then square it between the two toe nail holes, champer or roll the front of the shoe, fit it to the foot and then carefully trim the heels of the shoe to the exact length of foot. HARRY FELLS.



THE MARYLAND SMITH IS CALLED UPON TO MAKE OYSTER DREDGES AND OYSTER TONGS

A Ship Smithy of Maryland.—The accompanying engraving shows my blacksmith shop. It is not a very pretty place but I thought it might be of interest to you and some of my brother smiths who don't live near the salt water where we grow oysters. My principal business is making oyster dredges and oyster tongs for catching oysters out of the rivers and bays of Maryland. You will notice in front a number of stands with spools in the top of them. They are dredge winders and are solid iron weighing from 100 to 250 pounds a piece. It takes two of these on each dredge boat. The size of the winder corresponds to the size of the boat it is used on. You will also notice some dredges on the ground. They weigh from 50 to 200 pounds a piece and two of them are dragged on the bottom at the same time. The boats engaged in this business carry from 4 to 13 men each, and catch from 25 to 200 bushels of oysters a day. The dredges are all hand work and are made from wrought iron and steel. I do a little wheelwright work but my main business is ship smithing and dredge making. In the picture from left to right; the man in the black shirt and bareheaded is "Your humble servant." The next in line is Capt. L. J. Thompson one of my customers. He is a captain of an oyster vessel. Next

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is W. Croswell one of my journeymen. He has his foot up on a dredge. Next to him is Capt. Bland, and the man in the door is Julius Haddaway, who is one of my helpers. O. H. RIDGEWAY.

Wants to Correct the Gait.—I have been a reader of your valuable paper for three years, and as I am having trouble with the shoeing of a road mare, would ask some brother smith to please help me. The mare in question stands toe wide to a very marked degree and is a bad interferer. This is in front and she breaks over toward the inside toe. I levelled her feet, and shod her with a side weight shoe, with the inside heel calk slightly higher than the outside. Then I welded on a cross bar just back of the first nail hole. The cross bar was ⅜ of an inch at the outside and half an inch on the inside. It was to make her break square over the toe and the side weight to widen her out After these shoes were on, she broke square over and started wider from the ground, but just before her foot got to the other one she would swing in and strike the opposite pastern with her inside toe. How should she be shod? I have just had one trial. Others have tried too. A. E. PRICE.

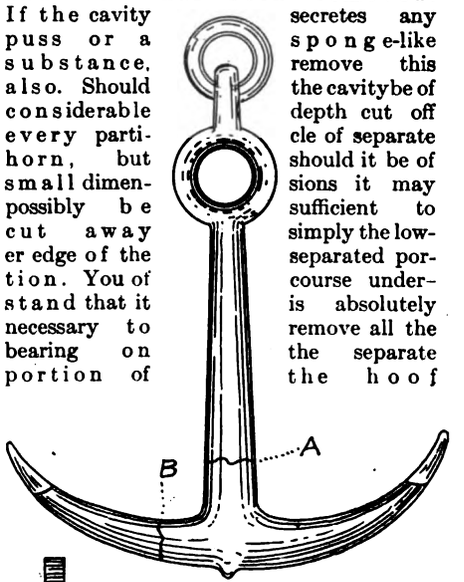
A Talk on Credit Giving.—I notice in the September number of THE AMERICAN BLACKSMITH a talk on credit by P. M. Wade. He says he employed it very much. All brothers must if they would hold customers and oblige all to a certain extent. Of course all rural smiths can use wood or bark for fuel, have a garden to plant and in various ways use such men. They can go to the station and haul your freight and in various ways can pay their little bills very easily. All brothers know that if you do not do their work they will tell everybody you cannot do a good job. While this may not stop good customers, it will hurt you because some will say that if you do that way with one you will do them also. Therefore I always do their work a little better, because they will then tell everybody what a good smith you are, and the people they tell might be someone who is not a customer of yours.

I buy all my stock and tools from our best jobbers; those who can send you anything you may call for at the most reasonable price. When I find they don't treat me right because I am poor, I quit and go where they will. I generally pay spot cash. If I need a little favor I am just as good as he who gets time and all his material. My motto is, and always has been, "Do unto others as you would have them do unto you." A. S. PRIMMER.

Repairing Old Wheels—I give you a little sketch of how I repair old wheels. Perhaps I have a larger experience, than most men in this locality, in repairing wheels that are loose in the hub. If a patent wheel, I mark it so as to replace the spokes the same as they came out of the hub. I then put the spokes in the vise and carefully drive off the rim. Then I take one and if the tenon is broke above, saw it off at the shoulder and split it up into thin pieces. Now clean off the tenon and mortise, insert in glue and then put one of the pieces on the bottom of the tenon and with a block made to fit top of tenon drive the spokes down all around. Drive every other one first and then fill in and finish. Now send it to the smith shop so the tire can be set while the glue is soft. After putting on the tire, screw the wheel down just right and then with a small smith hammer rap over every spoke about twice around every wheel until cold. Now bolt and finish and you have a wheel that will under any ordinary usage last 12 months. That has been my experience. I have repaired the wheels of heavy two-seated surreys for three successive years and have never found an entire wheel loose. When I fix a wheel and set the tire I wedge the rims on tight, saw out and bolt so as to have all dish alike. This is a matter of good judgment on the part of the mechanic, but experience soon teaches him what a wheel requires.

The principal is to clean, fit and finish up the wheel right along. No waiting till some other day to put on rims and tire. That part is well enough if you have time enough to do it. GEO. W. HARRIS.

Curing a Seedy-Toe.—Replying to Brother Brown who has a case of seedy-toe to cure would say clean the toe out thoroughly until every particle of dust and dirt has been removed. If the cavity secretes any spong e-like puss or a substance, remove this also. Should the cavity be of considerable depth cut off every particle of separate horn, but should it be of small dimensions it may possibly be sufficient to cut away simply the lower edge of the separated portion. You of course under-stand that it is absolutely necessary to remove all the bearing on the separate portion of the hoof at the toe, and to prevent any dirt from becoming wedged in the cavity. Both of these, if not prevented will continue to separate the horn from the foot. After paring the hoof, poultice the foot until the soreness which is naturally present, has entirely disappeared. The animal may now be shod with a bar-shoe having a toe-plate or exaggerated toe-clip to protect the soft horn.

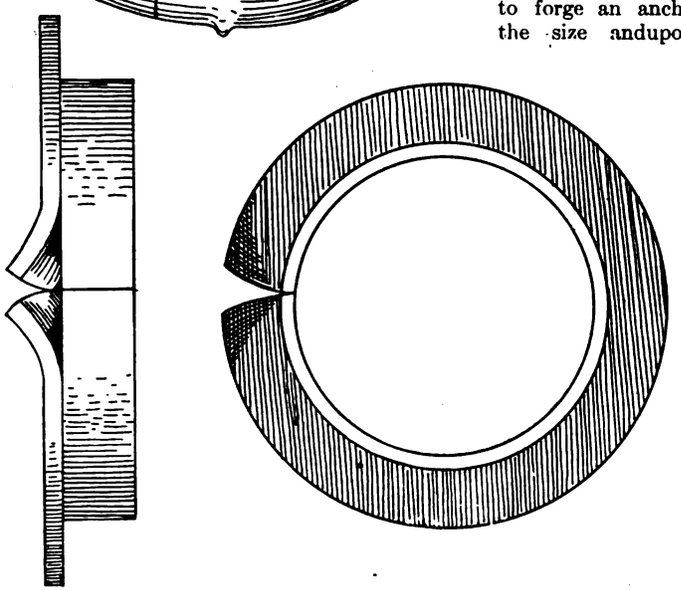


The foot should be carefully watched at each shoeing and should the new horn, which will continue to grow down, be separated from the foot, cut it back carefully until it grows down solidly. A mild blister may be used on the foot perhaps twice a month to encourage the stimulating growth of healthy horn. It may possibly take a year to cure a bad case of seedy-toe, but when the wall has grown down solidly you will have a permanent cure.

The cause of seedy-toe is undoubtedly the lodging of a small stone in the foot and in the failure to remove it promptly, the stone will naturally become imbedded in the wall and work upward until it separates the horn wall from the inner layer of soft horn. This makes the cavity which is generally known as seedy-toe. O. A. J.

Cement Floors—Anchors—Flanged Rings.—I would like to advise Mr. Anderson to have a concrete floor, by all means. I have one and find it wears much better than I thought. It also makes a warm, clean, dry shop. While we did not put down the floor, I have seen a lot of this work done and think to get best results, would be to level the floor off five inches lower than desired, mix the cement two parts cement, five parts sand and seven parts broken brick, stone or pebble about the size of an egg or smaller. Mix these and put down 4½ inches. Then mix one part cement to three parts sand and finish off with this. If the floor is to be used for shoeing purposes I would cut it up into 3-inch blocks with a deep groove. But if no horses are to go on it I would leave it smooth without marks or coloring as his finishing (I can't remember the name) won't stand the heat like the cement, so it is better to have it rough.

Messrs. Bewley & Stoker ask how to forge an anchor. This depends on the size and upon the tools and stocks they have. They ask how to mend one that is broken, as shown in the engraving. If it was an iron anchor I would butt-weld break A in almost any size anchor, and would scarf and weld break B the same as a common weld. If it needed it I would put in a dutchman, to tie together or fill up the hollow places. To weld the ring I would bend the ends of the flanges back out of the way, and then scarf for a "dab" in the upper flange. Now heat and put in the "dab," catch another heat on this for good measure and then bend the ends of the outer flange back in place. Put a "dab" in this side on the



MENDING A BROKEN ANCHOR AND A FLANGED RING

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bottom of the flange letting the end of the "dab" extend a little over to fill in the hole that was not reached by the first "dab." To ascertain how much iron it takes to make the flange I find out the weight of the flange and then find out the weight per foot of the iron I have, and allow a little for waste and packing. For instance, if the flange weighs 20 pounds and the iron it is to be made of weighs 40 pounds to the foot, allow about 6½ inches to upset. I hope these suggestions will benefit the parties concerned. RICHARD E. STEPHENSON.

A Short Talk on Shoeing.—Having noticed in your journal of September several inquiries, will to the best of my ability to try to answer some or all of them. First, Brother Knight wants ideas of the craft as to the use of rubber pads. While I don't approve of their use in a hot dry climate, they are good in a cool climate, especially on slippery streets. We use them occasionally for tender feet and heels, but Brother Owens' method is a good one to follow in many cases, using bar shoes to remove heel pressure and using toe nails and no heel nails. This is a method I use for weak heels and quarter and center cracks.

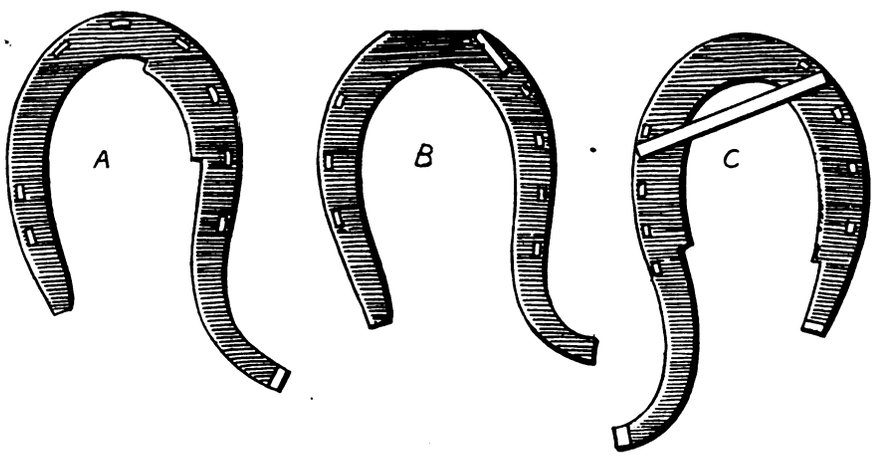
I think I gave my method for treating center cracks. If I didn't I will do so now for benefit of any of the craft that have any to treat. I use a bar clip on each side of the crack, cut hoof away under front of shoe so that there is no bearing and cut a channel along the split or crack the whole length of the latter. Now cut across the top of the crack with the rasp or knife, and fire same with a sharp edged firing iron. Bore or drill through the hoof in one or more places as required and insert small horseshoe nails. Now clinch same with pinchers or tongs as tightly as required, removing hoof from toe as firing causes hoof to separate from the flesh and gradually grow downward. This method acts on the same principle as treating a person's toe for ingrowing nail. The method for that is to notch the nail in the center causing the nail to grow towards the center of the toe, thereby removing the cause of the trouble.

For the benefit of Brother Mitchell, will say, my method of treating corns (so an animal can work right along) is to remove half or two-thirds of the corn. Do not allow the shoe to bear at the heels. Place a piece of brimstone about the size of the head of a small horseshoe nail, on the corn and apply a hot iron. Allow it to burn all the brimstone and use any kind of oil to soften charred place. Do not use heel nails.

I noticed Brother Dettbrenner asks about cross firing. I will give him my method. For the front feet I use a convex shoe, fitted exactly the shape of the feet inside and out. For the hind feet I use shoe similar to one at C for forging, omitting bar across the toe. I sometimes weld a calk on the outside and sometimes on the inside, between the first and second nail holes, as at B, running lengthwise of the shoe. The accompanying negraving illustrates the shoe.

In regard to stumbling, I agree with Brother Perrin in most all particulars. First find the cause, then shoe so as to overcome it. I have many stumblers, but if I ever allowed my way there wouldn't be many. One case, a fine road mare, has been a chronic stumbler. My method is a rolling motion shoe with swelled or block heels. Trim the feet as near level as possible. This shoe makes the animal break over better and gives her better knee action, as stumblers don't raise the front feet enough.

In regard to that knee hitter Brother Barnes' method is a good one, but it will not answer in all cases for we often have to use a shoe for this fault much heavier outside. I think I gave my method for interfering in a former letter. In nearly all cases I use a side weight, see A, placed opposite to where the horse strikes. No nails are used on first quarter of the inside. The inside is levelled on first quarter. Occasionally I use a long drag heel on the outside, with a long heel, if the horse is a chronic interferer. GEO. WHERRY.



A FEW SPECIAL SHOES FOR INTERFERING AND CROSS-FIRING

Day Work vs. Piece Work.—The subject is one that has and is pushing itself to the front in all departments of mechanical activity. It has been discussed and written about for many years, and has been practiced in all countries at various times, in different ways, and with varied results; but it will not be laid at rest or set aside. It pops up in different dress and in unexpected places, with new features added or old ones altered to suit the occasion; but it is the same old story of what is best both for the employer and the employe.

I think, however, that it is nearing it proper solution. Our present system of classification of workmen is practiced more or less in all our manufactories. This is about as follows: We find one man is better at one class of work than another man so we keep him at this work until he becomes an expert at it. Another man becomes proficient at another job or two, and so on all through the shops. One man is an expert frame maker, another of motion work, and another of tools or spring making or spring gear, etc. We are rapidly losing the general workman as a man who can turn his hand to any job that comes in.

The consequences are that, whether our shops are working on day work or piece work system, the results are the same in the end; the making of expert workmen in one or two jobs and the losing of the old-fashioned general all-around man.

Now this being so, the main question is, the most good to both parties, or the most wages to the workman, and the most out-put at least cost to the employer. And in my opinion this result can best be obtained by the piece work system judiciously operated. For we well know by experience that most men do not put forth their best efforts at so much per hour as wages; but put them in a position to increase the wages by an increased out-put in a given time, by working for themselves, as it were and they will throw all their inventive genius and energy into accomplishing this object and the result wished for by both the employer and employe will be obtained

Now, I do not think that piece work can be successfully practiced in all kinds of work. I saw it tried, and honestly, too, on repair work with anything but success. The difficulty of getting a fair average price for the work to be done was the cause, and consequently there was dissatisfaction and suspicion on both sides, and it was dropped as a bad move. But in all new work it is all right.

There are difficulties to be overcome in this as in all other movements, and it requires a very fair minded man to judge the number of pieces to be made for a day's work and the right price for an article. While I think the foreman should be the judge as to the quality of the work done and see that the work is up to the standard, yet I think that the price should be fixed if possible by a committee of two men from each side with power to select a fifth to act as chairman. Then let those men fix a fair price for the work to be done in a given period. If, in the meantime, by the introduction of new methods or by new machinery the work could be done cheaper, let the committee decide what to give. I have come to the conclusion that nine-tenths of the trouble in the piece work system is caused by an unfair cut in the price of work done. This causes suspicion in the minds of the workmen that the employer wants them to get up new tools to increase the out-put only to take all the advantage of it by cutting the price.

Give the men fair treatment, with honest inspection of the quality of work done, and I think the piece work system is the best for all parties concerned, especially as every year sees the bringing in of improved machinery and methods of working; with a consequently increased out-put at less cost of production and with less manual labor than heretofore. A. STOCKALL.

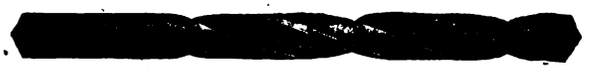
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Prices Current — Blacksmith Supplies.

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All prices, except on the bolts, are per hundred pounds. On bars and flats prices are in bundle lots.

Bars—Common Iron and Soft Steel.

⅛ in..	round or square;	Iron,	$2.80;	Steel,	$2.80
⅝ in.,	"	"	2.40	"	2.40
½ in.,	"	"	2.20	"	2.20

Flats—Bar and Band.

¼ x 1 in., Iron	$2.40;	Steel	$2.40
¼ x 1½ in., "	2.80;	"	2.80
3-16 x 1½ in., "	2.50;	"	2.50

Norway and Swedish Iron.

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⅜ in., " "	4.50
½ in., " "	4.80
¼ x 1 in	4.80
¼ x 1½ in	4.20

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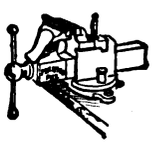
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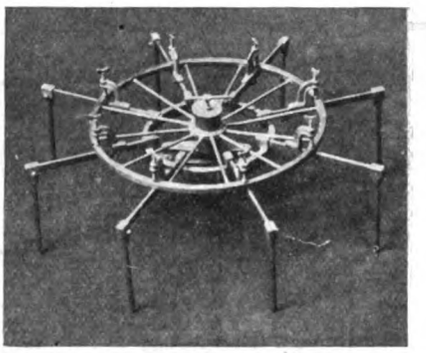
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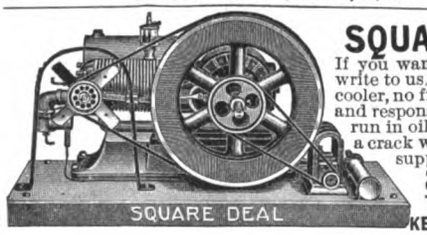


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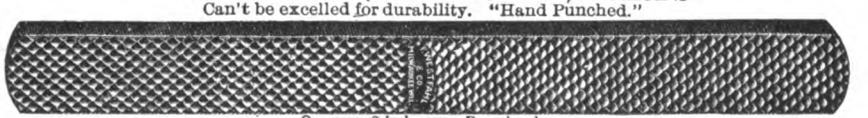
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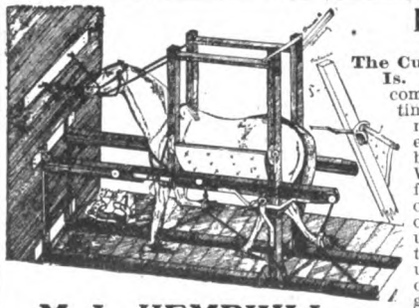
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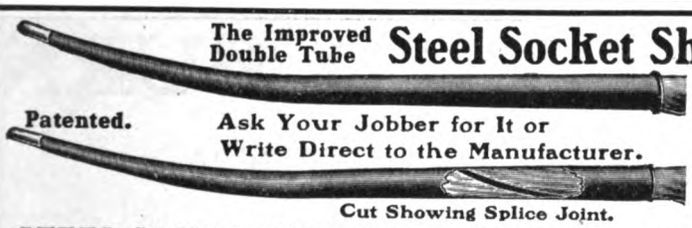
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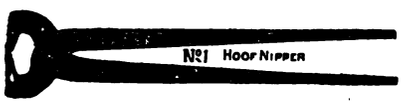
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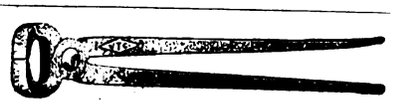
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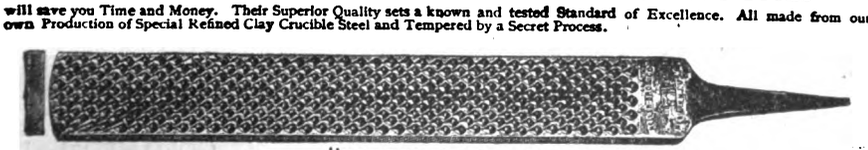
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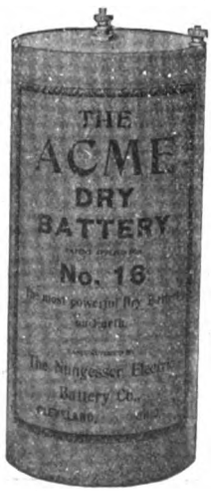
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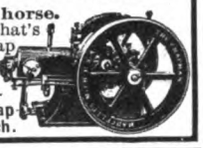
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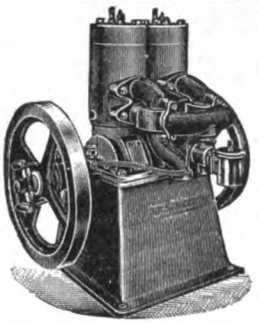
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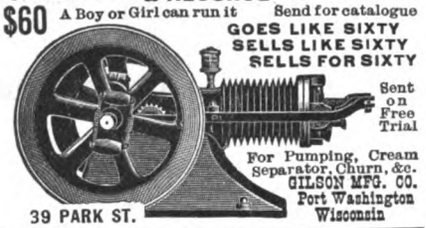
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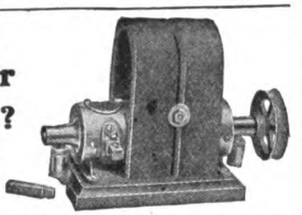


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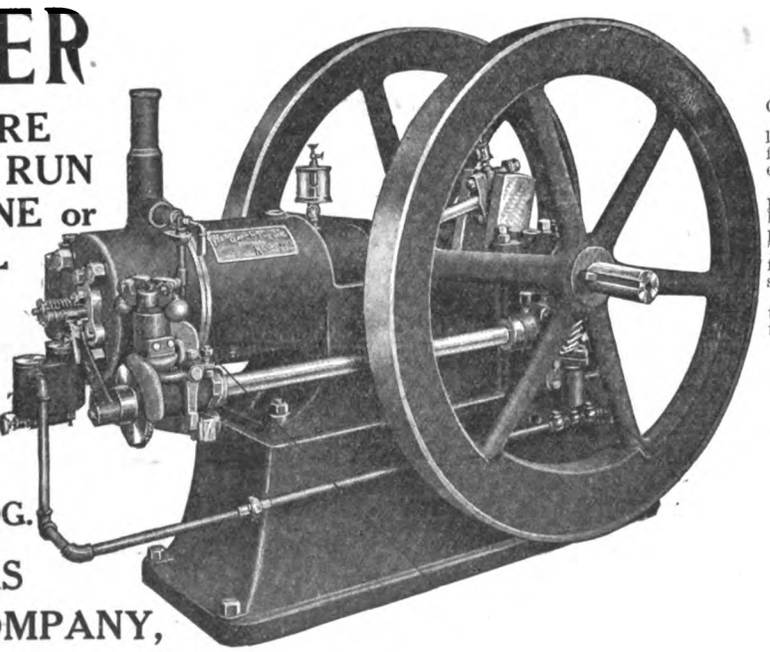
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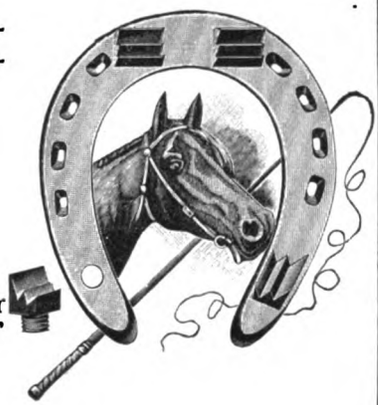
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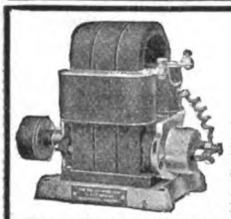
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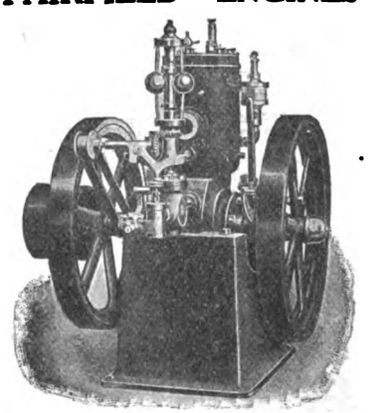
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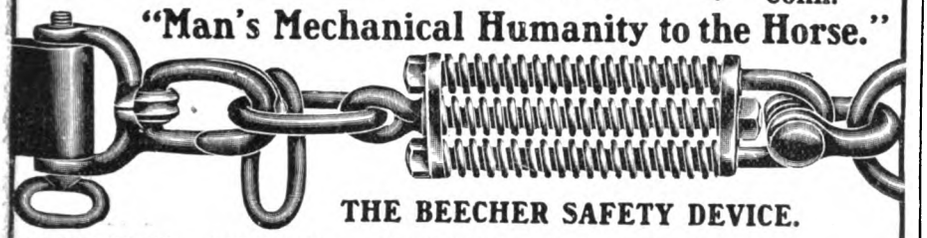
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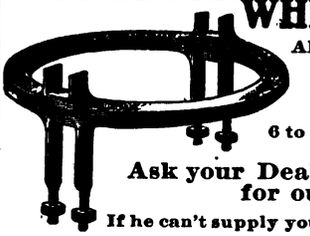


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All weights and diameters from 6 to 60 inches.

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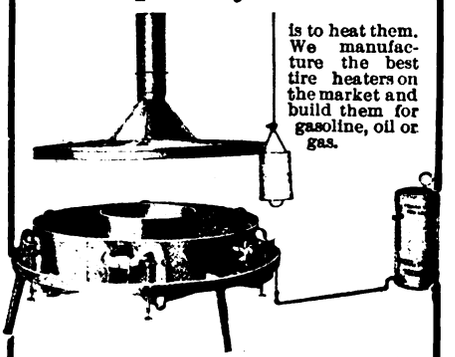
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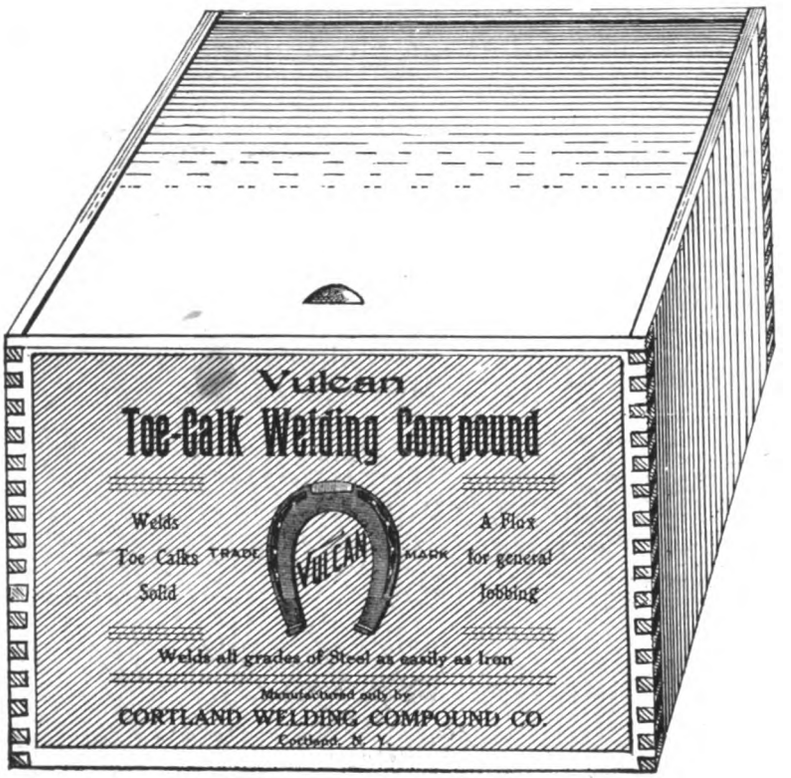
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To Any Blacksmith in United States or Canada

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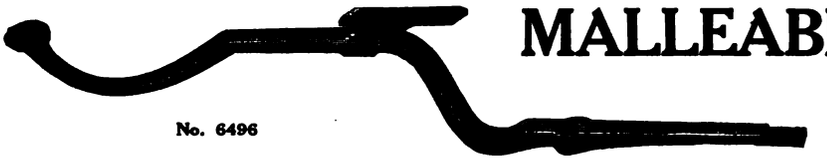
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Irons like these made and carried in stock all ready to apply to the job. And these are only a few specimens from an immense and complete line of

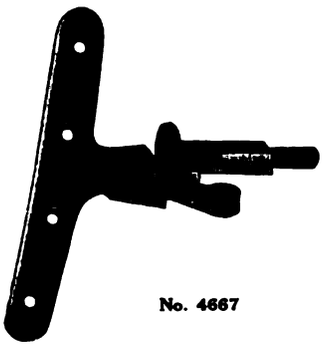
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If you build Surreys keep this advertisement where you can find it.



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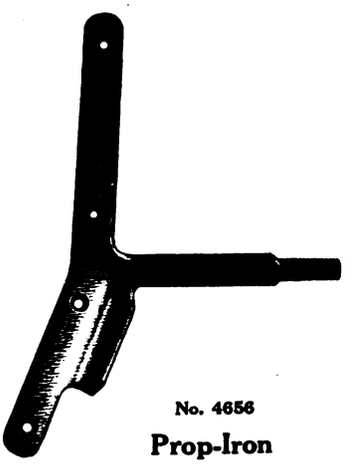
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Adjustable Prop-Irons with Fender Lugs



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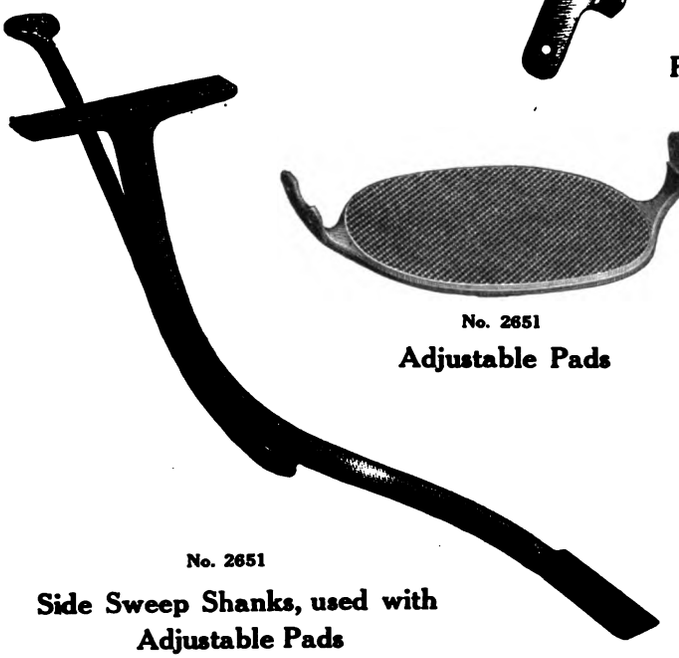
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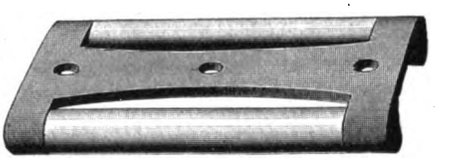
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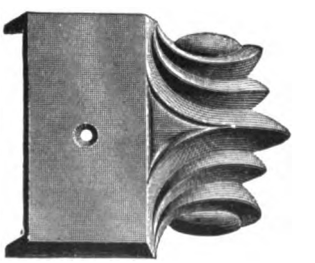
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No. 1686

Wear-Iron, with Rollers for Cut-Under Surrey



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Made for the trade by

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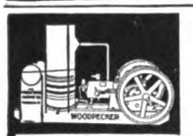
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Low Down Wagons
soon earn their cost on any farm.

Steel Wheels
for farm wagons. Straight or staggered spokes. Any size wanted, any width of tire. Hubs to fit any axle. For catalogue and prices, write to
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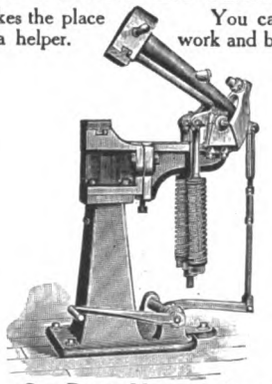


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NO TROUBLE
Starting, winter or summer.
With experts or experiments.
With foundation or connections.
With poor adjustments.
With bad mixtures.
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With expensive repairs.
With unfair factory.

3½ H. P. 7 H. P. 14 H. P.
Ready to Run on Gasoline or Alcohol.
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BY USING A
STANDISH
FOOT-POWER HAMMER.

Takes the place of a helper. You can do more work and better work.



Our Power Hammers give perfect satisfaction wherever used and they are doing good work in the best shops in the country. Drop us a card and we will send you interesting descriptive circulars free. Write at once—today.

The Standish Machine & Supply Co.,
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Success Oscillating Sleigh Knees.
For farm, road and lumbering Bobs.
Sizes, 1½, 1¾, 2, 2½, 3, x 3½ in. runners.
Satisfaction Sure.
Try Sample Set.



Valley City Bent Knee Bob Sleighs
For Pleasure, Delivery, Express, Sleigh, etc.
The Strongest, Neatest, and Best.

THIS is the Brown Oscillating Sleigh Knee.
Needs No Recommendation.
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Write for circular and prices on our complete line of sleigh goods.



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JUST A JINGLE OF THE TOOLS

¶ Is your reasoning capacity like a pint cup, will it only hold just so much and no more, or will it always take in just a little more when you think it already full?

¶ Why do you suppose we ask—well it's just this—we have three plain, simple facts about Solid Box Vises that should be considered and given some honest thought—before even thinking of making a purchase.

¶ Suppose you had a 60 pound vise with a jaw a little wider—and the range of the box and screw was greater allowing the vise to open a greater distance—and then it weighed 50 pounds not 45 or 46. Wouldn't it stand to reason that the vise would hold larger and heavier work, by having wider jaws and opening further—wouldn't it stand a little more rough usage if you had a few more pounds of the good, hard stuff to help you when it came to a tight pinch, where it takes all the vise can stand without straining or springing out of shape.

¶ Isn't it just reasonable enough for a concern to charge pound for pound for a vise? Presuming it is, then why is it that men think **COLUMBIAN VISES** are high priced? Don't we offer you a better vise, one that will do more work for you, one that is heavier?

¶ Now here, we have a Vise and Anvil catalog No. 16 that gives all the sizes and dimensions for a standard vise. We want to send this to you for your **OWN PROTECTION ONLY**, so when you do buy you'll get a vise that is standard and thereby get exactly what you're paying for. It will help you that much at least.

¶ We'll send it free of charge; simply ask for catalog No. 16.

¶ We make anvils, too.

THE COLUMBIAN HARDWARE CO.,
MANUFACTURERS
168 CHURCH ST., NEW YORK — Cleveland, Ohio. — 26 E. LAKE ST., CHICAGO.

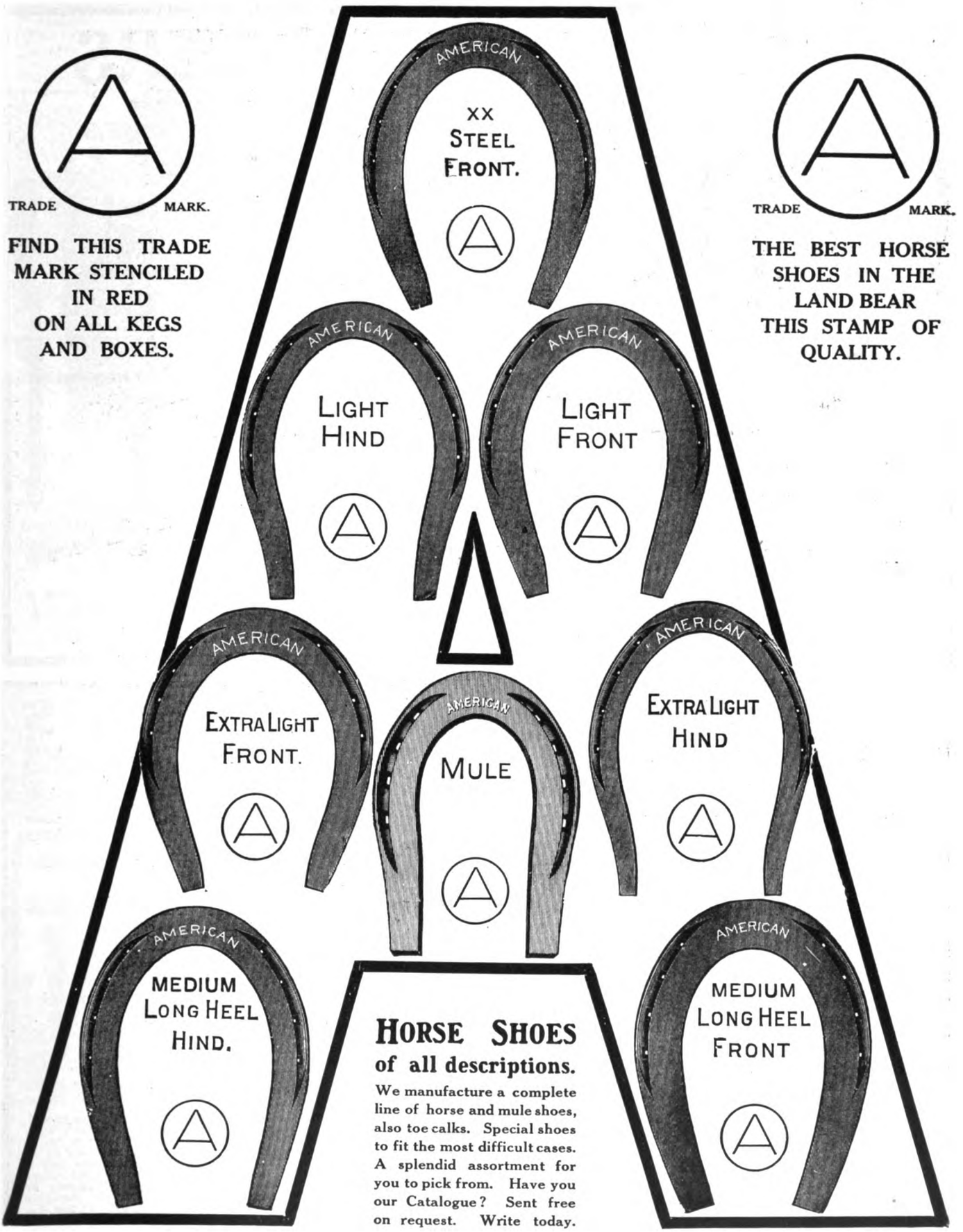
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FIND THIS TRADE MARK STENCILED IN RED ON ALL KEGS AND BOXES.

TRADE A MARK.

THE BEST HORSE SHOES IN THE LAND BEAR THIS STAMP OF QUALITY.



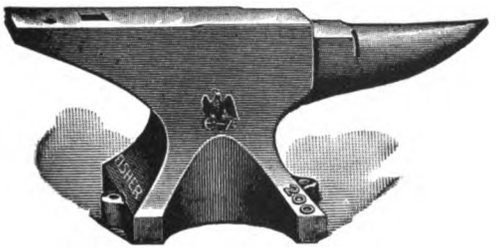
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of all descriptions.

We manufacture a complete line of horse and mule shoes, also toe calks. Special shoes to fit the most difficult cases. A splendid assortment for you to pick from. Have you our Catalogue? Sent free on request. Write today.

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"EAGLE"



ANVILS.

1843 1906

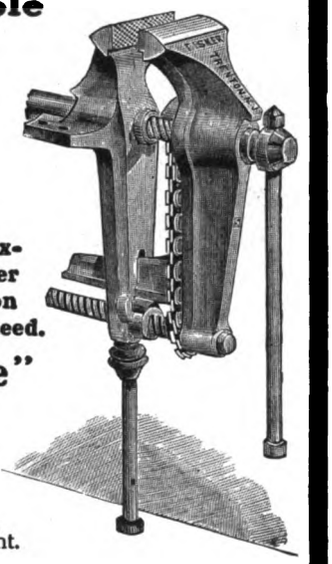
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"Fisher" Double Screw Parallel Leg Vise

Is sold by Reliable Dealers Everywhere. For Strength and Durability there are none better made. The "FISHER" is acknowledged the Best for Blacksmiths.



We have had over sixty years Experience in this line and offer you the most reliable Anvils on the Market. Every one Guaranteed.

WE BELONG TO NO TRUST--one blow on an "Eagle" anvil is worth two on any other anvil MADE

The Face Consists of a Single Piece of the Very Best Cast Steel Perfectly Welded and of the Hardest Temper. The Horn is made of Tough Untempered Steel and will neither Break nor Bend. All "Eagle" Anvils made with the Latest Fisher Patent Double Thick Steel on Both Edges of the Face. Made in all Shapes and Sizes up to 1300 lbs. Weight.

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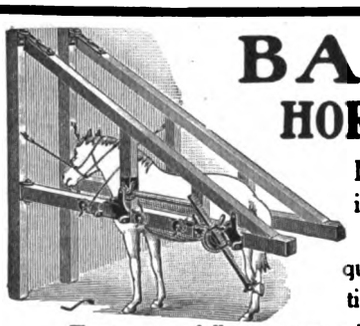


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In use in all modern shoeing establishments, because they fill every shop requirement and give satisfaction everywhere.

Every one fully guaranteed. All the objectionable features of the cheap stocks eliminated.

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Barcus Stocks Every Time.

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MR. GEORGE BARCUS:—I wish to say that the horse rack we bought of you gives perfect satisfaction in all respects.

Yours respt., HODGINS & DOUGLASS.

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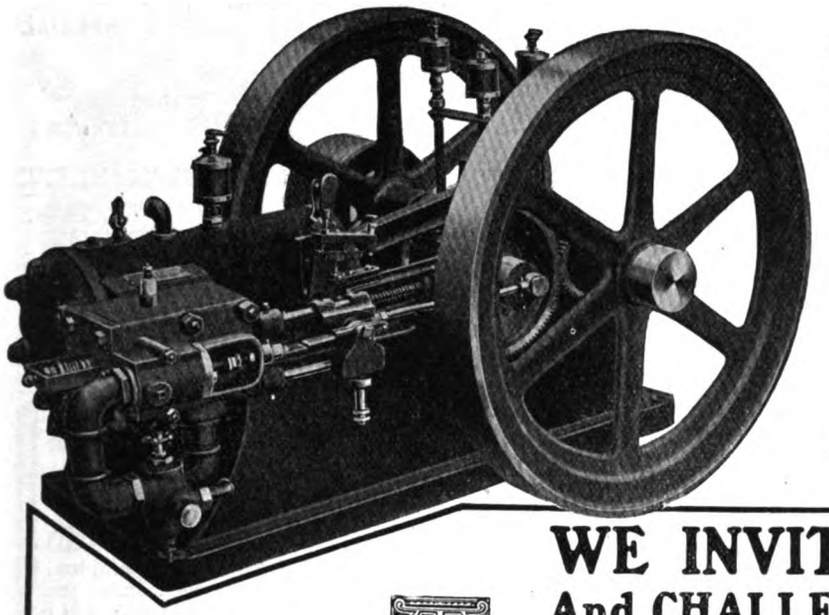
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2 to 25 Horse Power.

Always Ready to Start.

No Engineer Required.

No Increase in Insurance by their use.

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OUR "GIANT" 4 H. P. Engine
The Best on the Market for the user of small power. Write for details.

WILLIAMSPORT ENGINES are constructed by the most skilled workmen, and only the very best material used. We offer you an Engine of the Finest Quality, noted for its Simplicity, Durability, Ease of Operation and Beauty of Design. Our broad Guarantee covers all.

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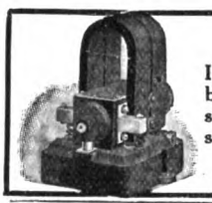
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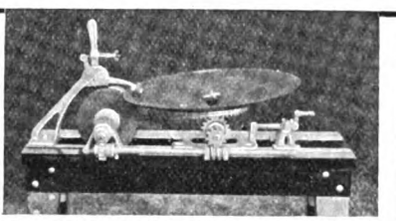
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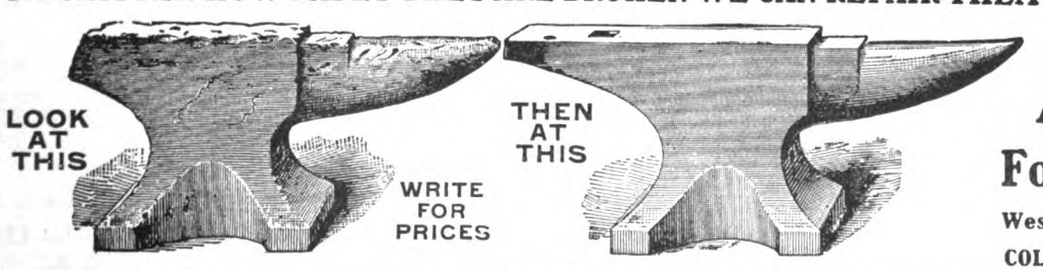
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Special Net Price on Sarven Patent Wheels (C. B. 50c. extra) with steel and rubber tire

Size of tread	Price per set for wheels with flat steel tire on and hubs bored	Price per set for wheels complete with channel and rubber tire on, and hubs bored. 36 and 40	38 and 40	40 and 44	Add to price of wheels for axles and boxes set
3/4	$6.25	$13.20	$13.40	$13.60	$1.90 L.D.
7/8	6.50	14.50	14.80	15.10	1.90 "
1	6.75	16.00	16.30	16.60	2.10 "
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Repair wheels, $4.50. We will rerubber your wheels for $7.25
Prompt shipments.
Five sets or more, one order you can deduct 25c. per set as freight allowance. **Write for catalogue.** We manufacture wheels with Steel or Rubber Tire on 3-4 to 4 inch tread. Buggy Gears with wheels and shaft all ready for body, $16.50
The A. Boob Wheel Co., Cincinnati, Ohio. U. S. A.

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This axle runs easier than any other, and requires no attention. "It's a Wonder." STANDARD BALL AXLE WORKS, Lancaster, Pa.

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THE "FOOL-PROOF" GASOLENE ENGINE

The "ELI" Gasolene Farm Engine is the only fit engine to have on a farm, where one is a good ways from the repair shop. The "ELI" is so simple that there's nothing to get out of order. It will run year in and year out without the tinkering that other engines require. It is the only engine without cams, gears, and levers. We call it "Fool-Proof" because, if some simpleton or a child should monkey with it, he couldn't make it dangerous. It is absolutely safe. Isn't that the kind of an engine YOU want? Then write for our free booklet, telling how and why it is so simple and safe.

MOLINE PUMP COMPANY, Sole Mfrs., MOLINE, ILL.

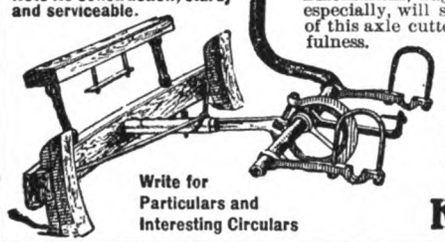
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KELLER ECCENTRIC BRAKE
Warranted to lock wheels with three ton load with ease; can be applied to any wagon. Works without aid of rachet. Made in two sizes.

Note its construction, sturdy and serviceable.



Blacksmiths, wagon and buggy repairers especially, will see at a glance the merits of this axle cutter and appreciate its usefulness.

It will cut a pipe, boiler tube or shaft, as little or as much as desired and do its work accurately, taking the merest shaving from the end or cut in two at any point, its bearings being all on one side of the knife.

Attractive proposition offered to live agents.



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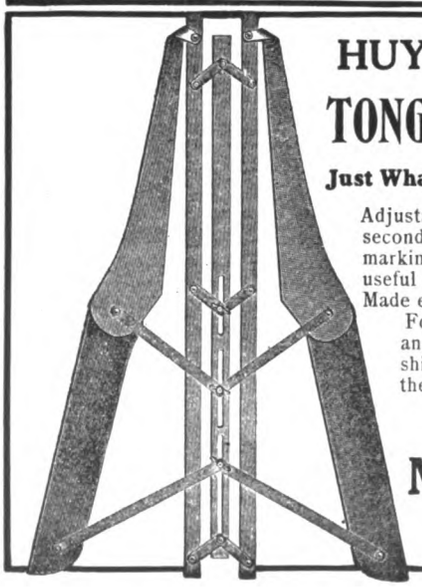
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HUYETT'S ADJUSTABLE TONGUE-HOUND PATTERNS
Just What Every Wagon-Maker is Looking For.

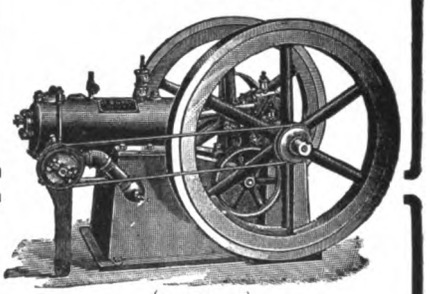
Adjustable to all conditions, requiring but a few seconds to adjust for any wagon, ready for marking out your Tongue-Hounds. It is also very useful for fitting in new Bent or Front-Hounds. Made entirely of Steel, weight, 4¼ lbs.

For sale by all Jobbers in Blacksmith and Wagon-Makers' supplies, or I will ship them direct to you on receipt of the price, $2.50.

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ECONOMICAL and RELIABLE POWER FOR THE SHOP-RUNNING BLACKSMITH and WAGON MAKER.

HAGEN ENGINES are recommended on account of their simplicity, durability, comparatively low price, small cost of operating and the ease and certainty with which they can be controlled.

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GAS ENGINE AND MFG. CO.
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Rip Saw, Band Saw, Boring and Spoke Tenoning Machine all in one. Each attachment ready for instant use, either for foot, hand or belt power.

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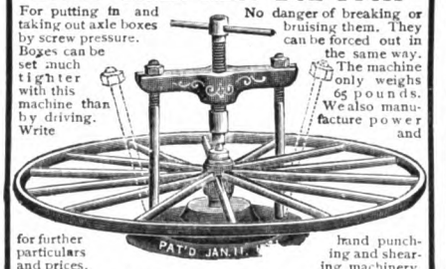


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For putting in and taking out axle boxes by screw pressure. Boxes can be set much tighter with this machine than by driving. Write for further particulars and prices.

No danger of breaking or bruising them. They can be forced out in the same way. The machine only weighs 65 pounds. We also manufacture power and hand punching and shearing machinery.

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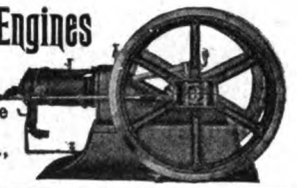
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Dealers Only.



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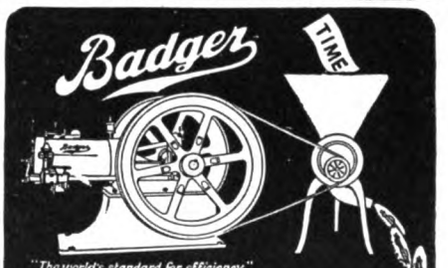


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Blades, Punches & Dies Made of Best Tool Steel
With or without legs.
Cuts ½ x 2 in Flat ¼ to ¾ in. Round Punches ⅝ in. hole in ¾ in. stock; ½ in. hole in ¼ in. stock.

Write for Circular describing this machine also our New I Beam Punch and Splitting Shear.

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Badger Engines enable the blacksmith to make the most money out of his time by enabling him to do more, better and a greater variety of work, and at the same time employ less help—saving cost of helpers.

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Badger Engines are easy to start and to keep going; cost almost nothing for repairs and last a life-time. They are as cheap as is consistent with best skilled workmanship.

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Write for attractive terms.

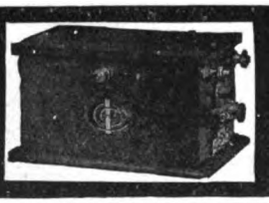
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Hand or power, for shearing and punching plates, bars and angles. Send for Catalogue C.
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Ignite your engine with our
IMPROVED I. C. C.
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We guanantee them against all imperfections in workmanship and material. Write us if your engine doesn't work properly.
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We make them in all sizes and varieties, **TO FIT ANY AXLE.** Any height, any width of tire you may want. Our wheels are either direct or stagger spoke. Can **FIT YOUR WAGON,** Perfectly without change....
NO BREAKING DOWN
no drying out, no resetting tires **CHEAP** because they endure. Send for catalogue and prices.
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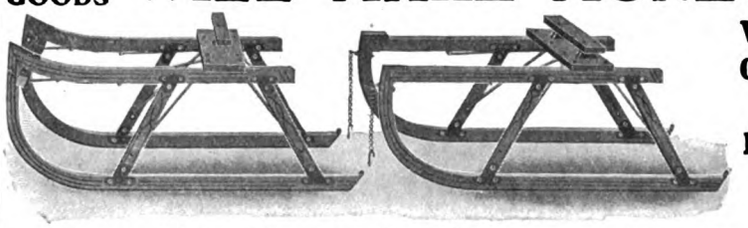
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THESE GOODS **WILL MAKE MONEY** FOR YOU



Write for Catalogue and Price List

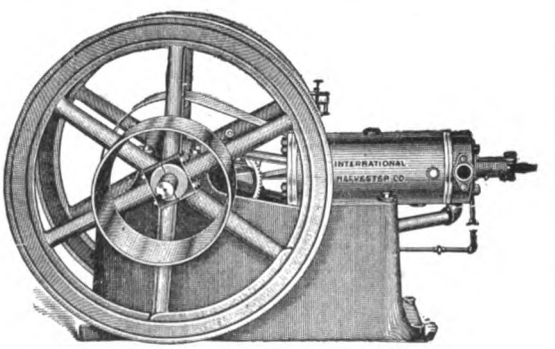
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Should be simple, easy to run and keep in order, of full rated horse power, economical in fuel and the use of oil, free from the necessity of repairs and so constructed as to endure indefinitely. These power essentials apply in a high degree to the

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In addition they are adapted to every power use and requirement. They give perfect satisfaction under proper installment.

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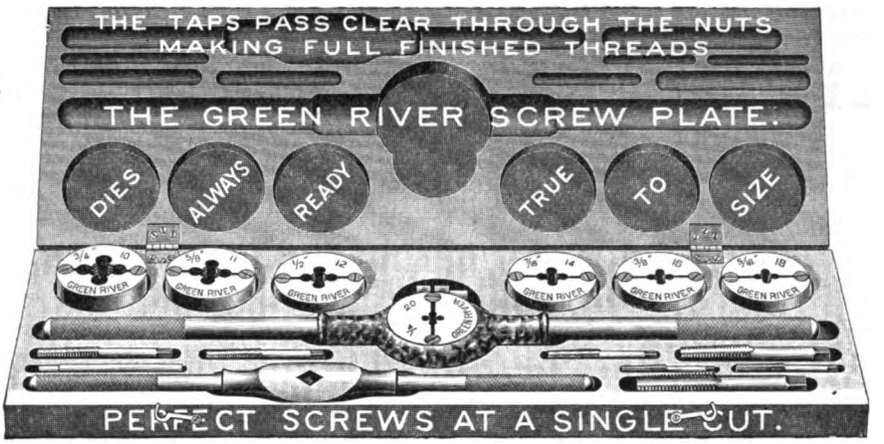
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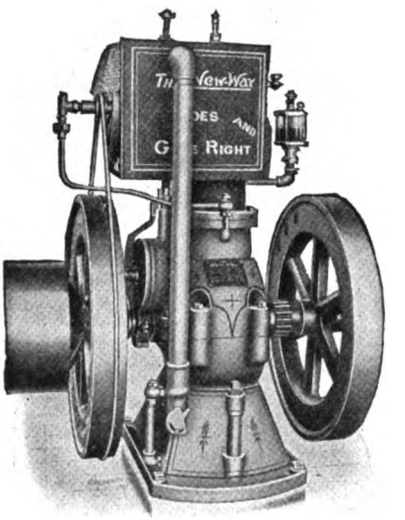
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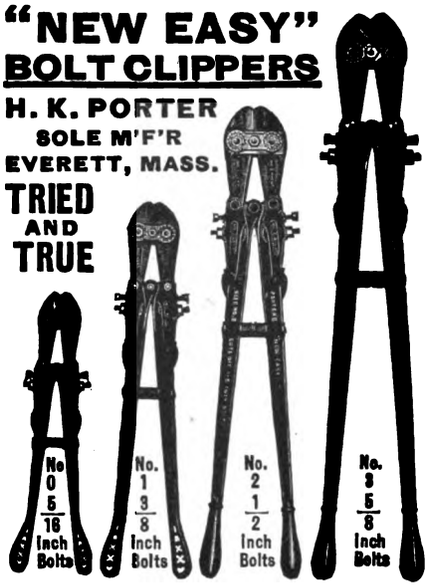
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REFUSE CHINESE IMITATIONS OF THESE TOOLS; THEY ARE INFERIOR.

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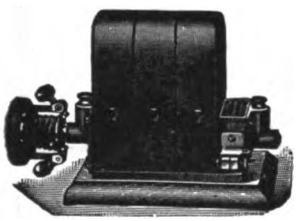


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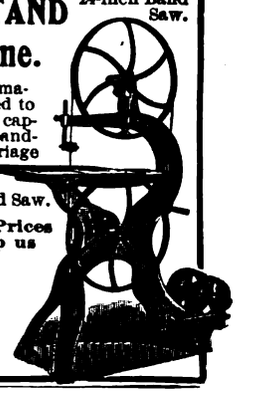
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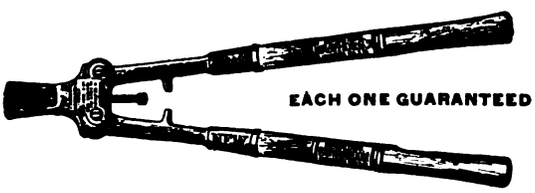
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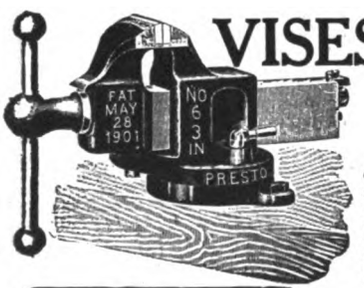
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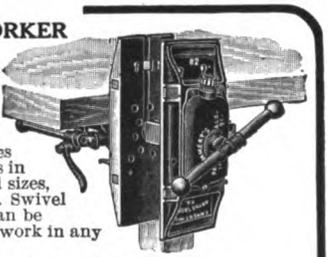
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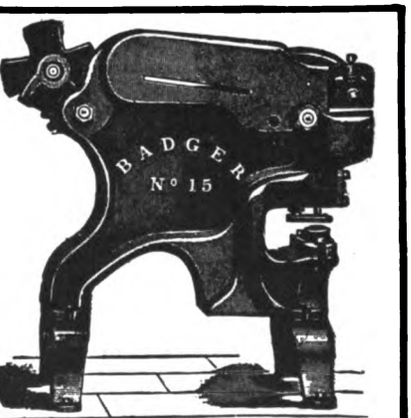


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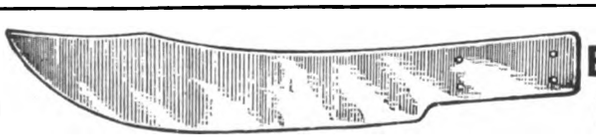
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Shear 4 x 1/2 in. Flat Iron
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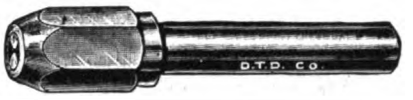
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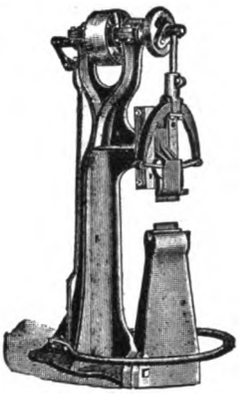
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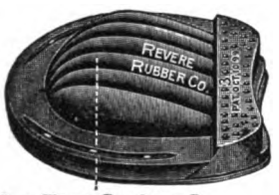
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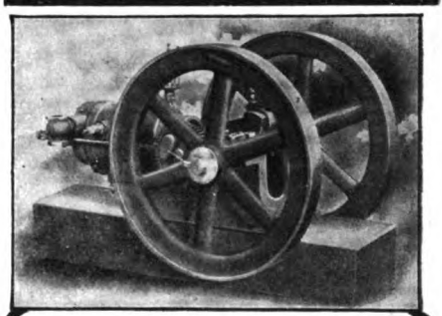
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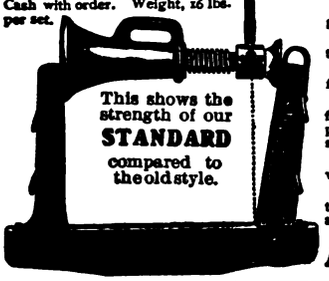


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This Malleable Iron Bolster Standard has been tested thoroughly, and we guarantee it strictly as represented.

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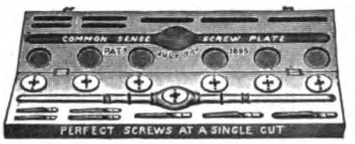


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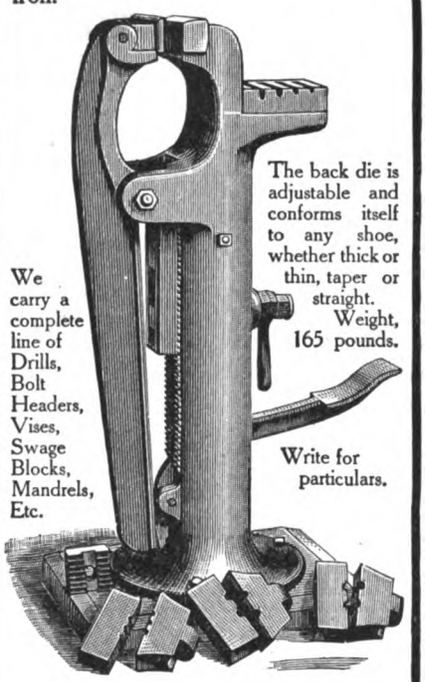
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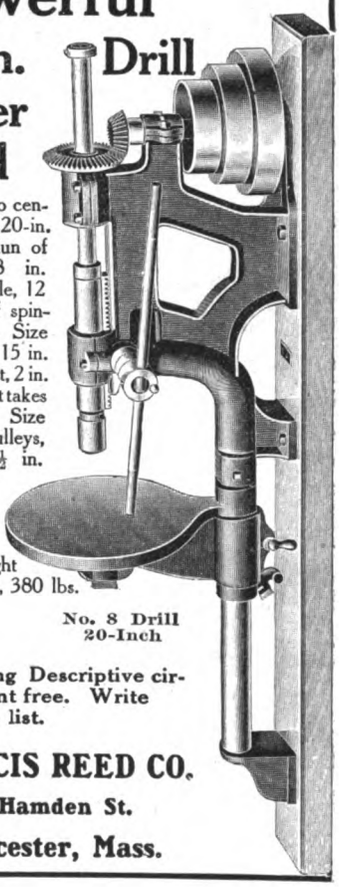
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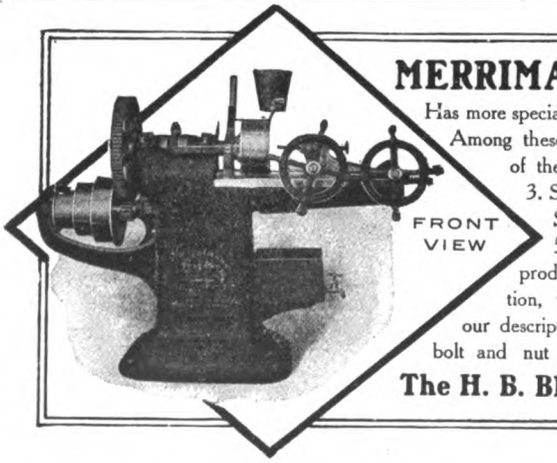


Will drill to centre of a 20-in. circle. Run of spindle, 8 in. Run of table, 12 in. Size of spindle, 1½ in. Size of table, 15 in. Size of post, 2 in. Drill socket takes 41-64-in. Size of cone pulleys, 6¾, 8½, 10½ in. Tight and loose pulleys, 8 x 3 in. Total weight of machine, 380 lbs.

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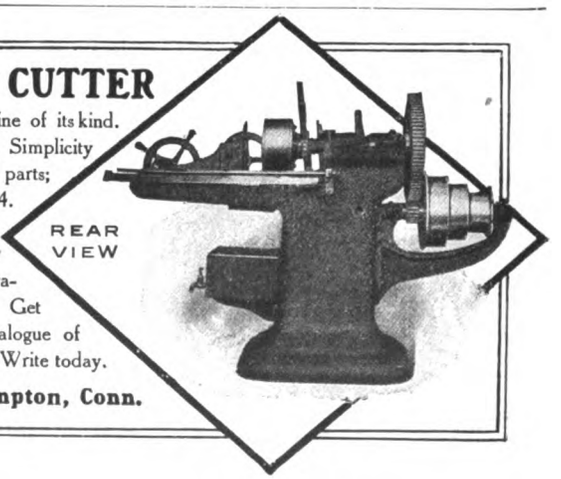
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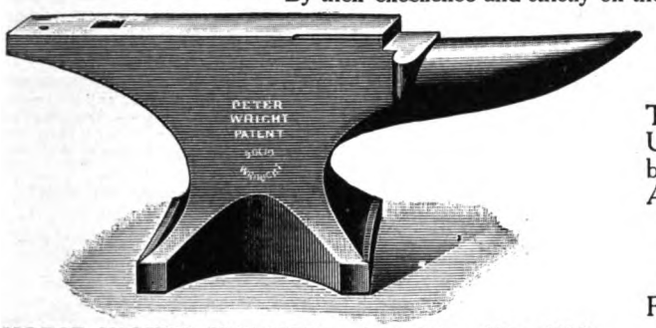
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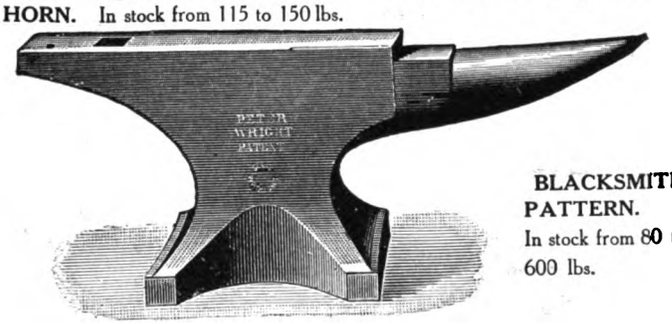
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Made of Best Scrap Iron
THE BICK FACE AND END ALL IN ONE SOLID PIECE

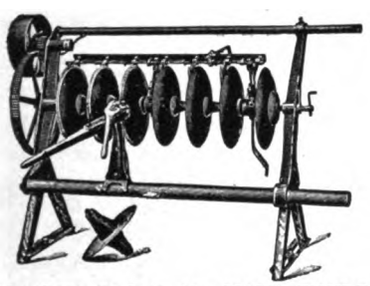
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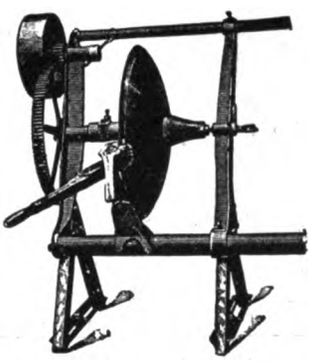
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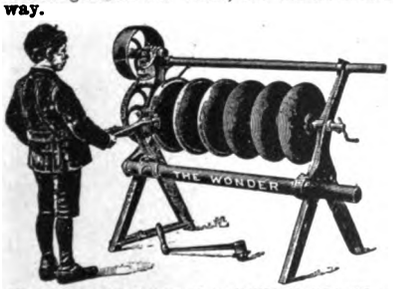
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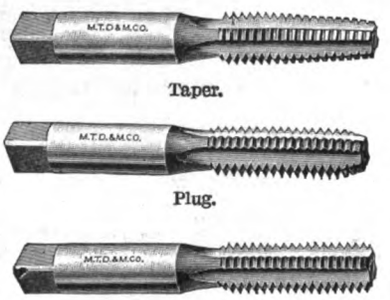
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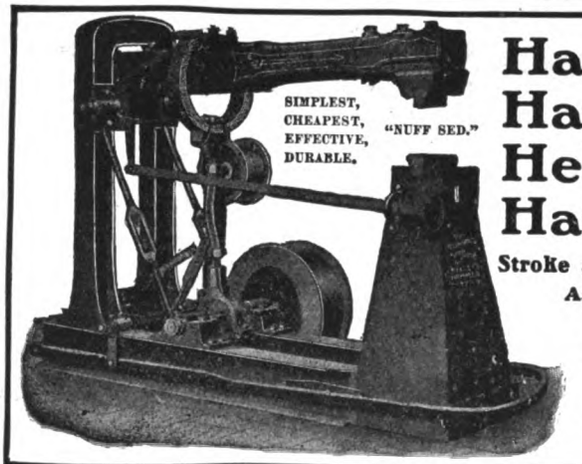




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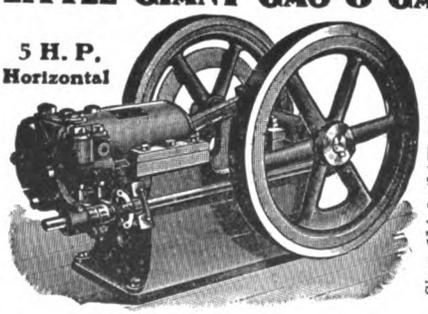
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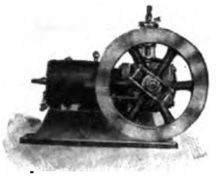
3 H.P. Vertical



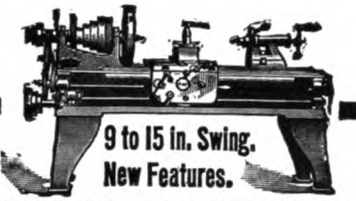
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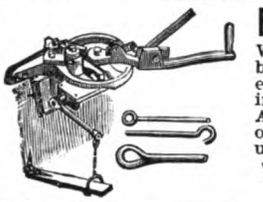


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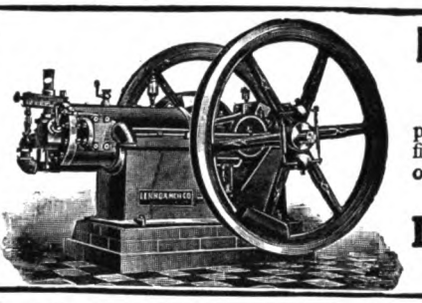
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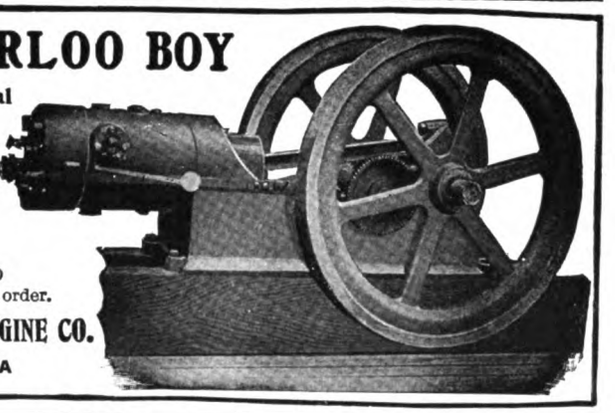
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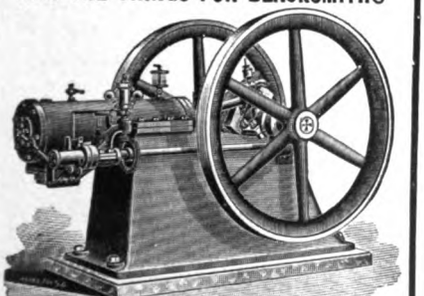


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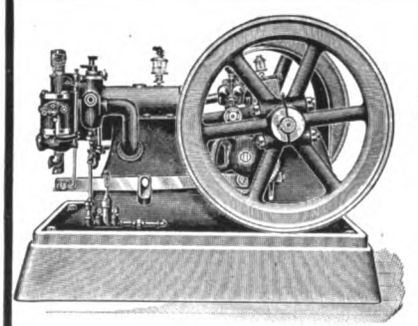
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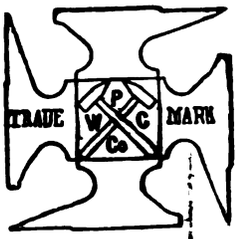
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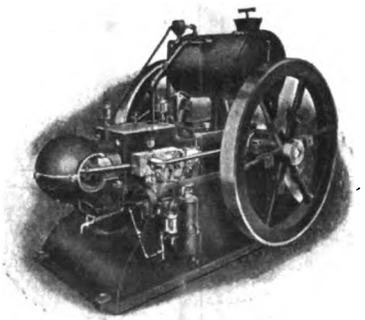
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Yours truly,
Albert Myers.

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Steam Cooled
Double Piston
No Foundation

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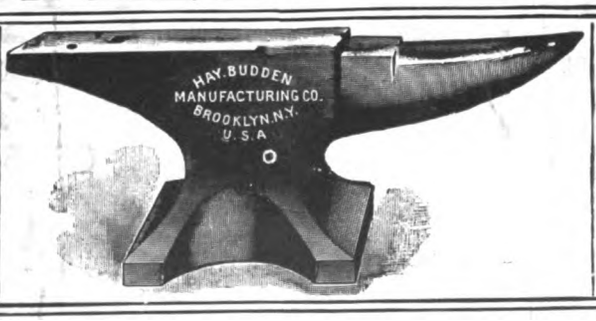
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VOLUME 6

THE AMERICAN BLACKSMITH

NUMBER 3

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BUFFALO
N.Y. U.S.A.

DECEMBER, 1906

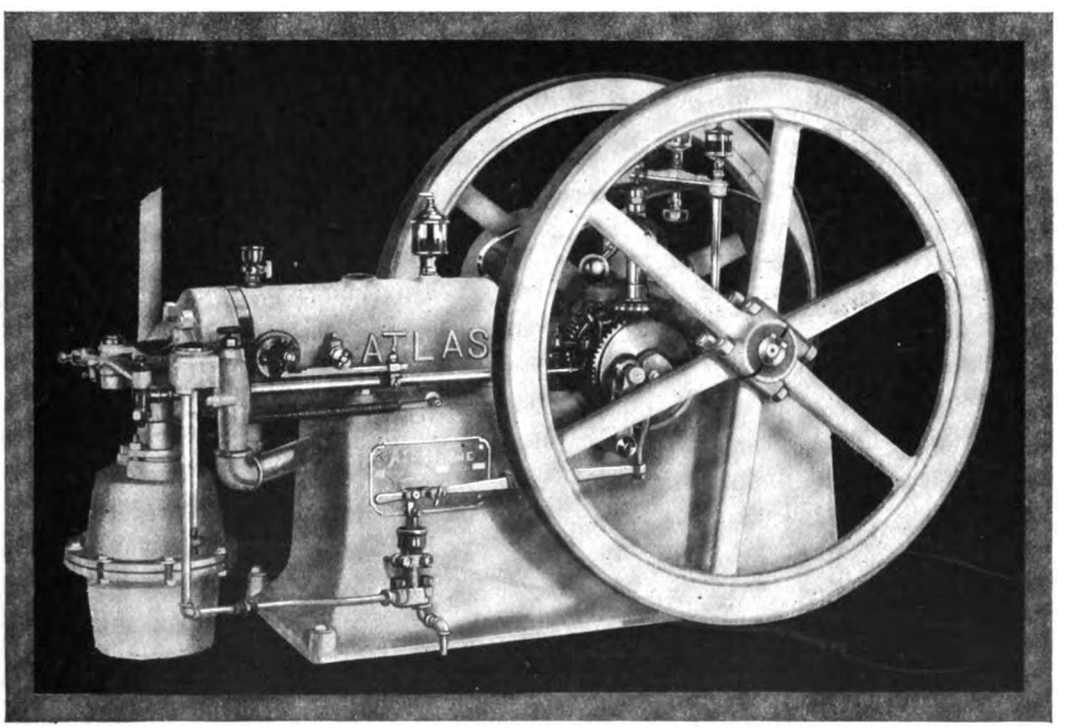
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THE

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GAS AND GASOLINE ENGINES

Show superiority in every line of design-finish, and the workmanship shows the touch of the high grade artisans. Study this picture carefully. Your thorough knowledge of mechanics will decide you to favor and buy the ATLAS ENGINE. You know the reputation of the ATLAS is higher than that of any other engine in the world.



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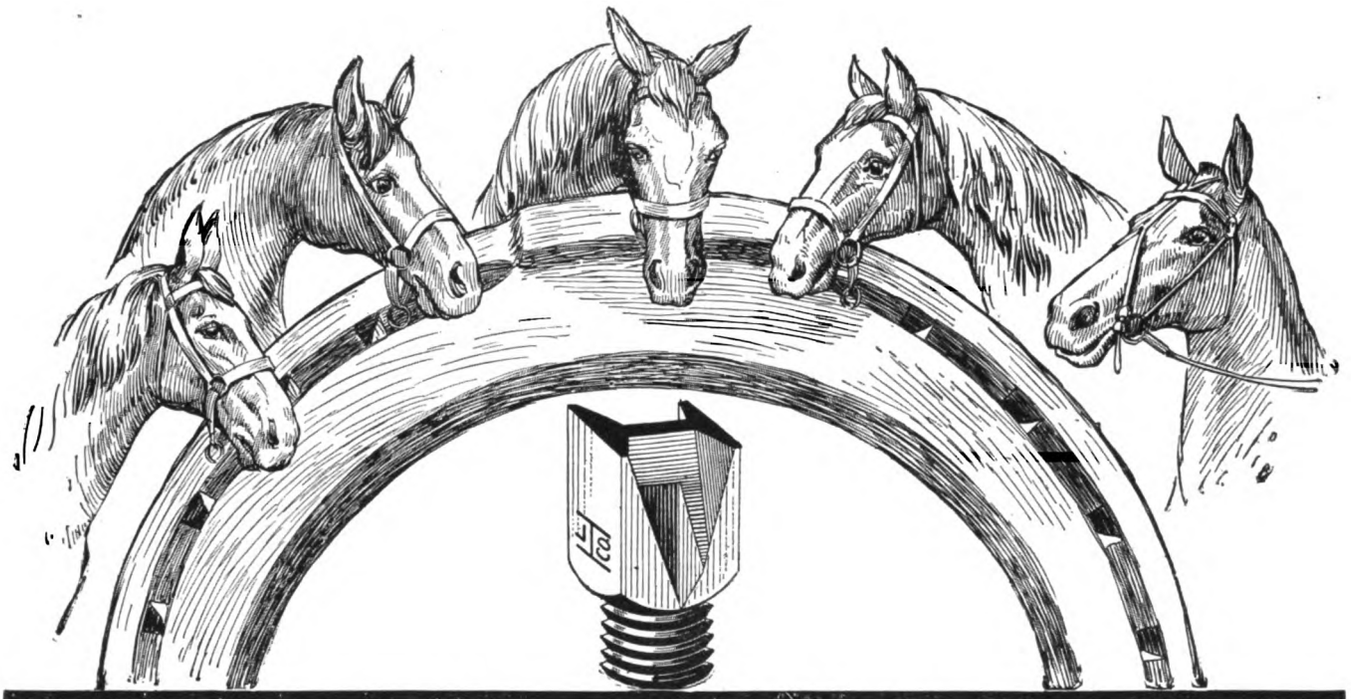
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"Lucky" Horses All Agree

Because they feel so brave and free
To travel over ice and snow—you see
When they use

H-CALKS



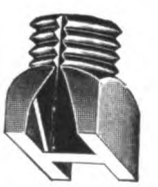
All horses "look upon" the H-Calks as their *favorite* of calks. Their attention is "centered upon" this *self-sharpening* calking device. It appeals to even their "common-horse-sense"—it is so *simple*—yet so superior, with its many pleasing *merits*—the material points which causes horses to regard the H-Calk as the *cause* and *effect* of their luck. It saves their limbs and lives—their feet *remain solid* where ever placed—they cannot *slip* or be *moved* until lifted upward by the horse.



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Having no sharp yet dulling point.
H-Calks never injure the horse or disappoint.



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Convey the same idea of *luck* to the horse that the horseshoe does to man—but H-Calks *positively insure* the horse's protection. *Reason* it out yourself. Luck gives confidence to man to do great things. H-Calks give horses *marvelous nerve*—unfearing ability to travel over the most dangerous icy highways—or even wet or dry slippery pavements. Wonder at it, you would, if you could see all the horses that "yet live" to-day, *saved* by the winter use of H-Calks. All enterprising blacksmiths and horseshoers supply H-Calks, as it *proves most valuable* to do so—because we *protect* your trade by an agreement with the N. P. A.

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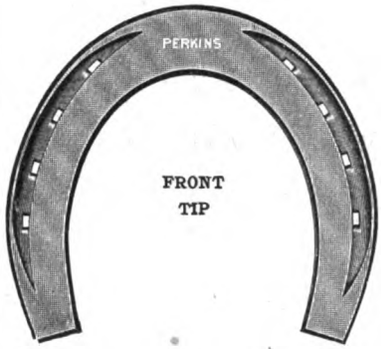
H-CALK CO. (Inc.). 16 Beaver St., NEW YORK.

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HIND
LONG HEEL.

Look for this Trade Mark ★ The Star brand beats all others



FRONT
TIP



FRONT
LIGHT.



FRONT
TOE WEIGHT.

★PERKINS★
HORSE SHOES
AND
TOE CALKS
The **SUPERIOR** Kind

Have more points of superiority than any other make. An up-to-date shoe for up-to-date Blacksmiths.



HIND
SIDE WEIGHT.

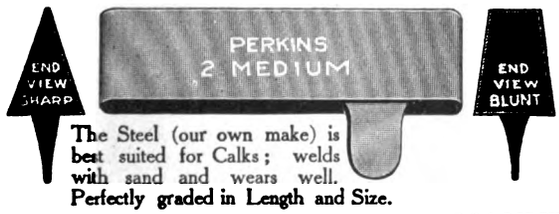
Perkins Shoes have given satisfaction wherever used. Our line is complete and every shoe guaranteed. Made in all styles and sizes. Send for sample. New Pattern Front Extra Light and Light. Free for the asking. We will gladly send

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WRITE TODAY.

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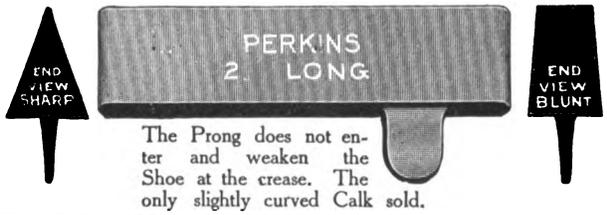
Made in Medium and Long, both blunt and sharp. Packed in 25 lb. boxes.



The Steel (our own make) is best suited for Calks; welds with sand and wears well. Perfectly graded in Length and Size.

TOE CALKS

Chisel Pointed Prong. These cuts show exact size of No. 2. SAMPLES SENT FREE.



The Prong does not enter and weaken the Shoe at the crease. The only slightly curved Calk sold.

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RHODE ISLAND PERKINS HORSE SHOE COMPANY

PROVIDENCE, RHODE ISLAND.

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IF YOU are one of those who ARE NOT on the alert to save money, time and labor in your smith shop or carriage factory, then *don't read this ad.* We are after the discriminating man, the wise, careful, far-sighted man, the man who believes in the best—the man who wants to save money, time and labor.

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Durability, Strength, Accuracy.

Every part of every machine is a strong part and made to perform its work perfectly. We mention a few of them here. Send for booklet for full information.

BAND SAWS—neat, new designs, substantial construction, table adjustable to different angles up to 45° for bevel sawing; used for cutting cloth, ice, cardboard, sheet metal, brass, etc.; several sizes.

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PORTABLE FORGES—in all sizes and prices—light-running, convenient, durable and economical—real money savers.

We want to prove the merits of these and our other machines. *Ask us for our booklet "Carriage Maker and Blacksmith Tools."* It's free.

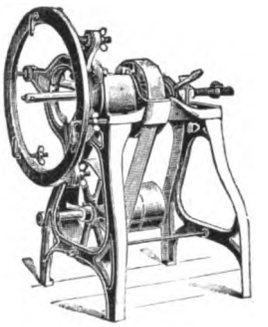


Fig. 708.
HUB BORING MACHINE.

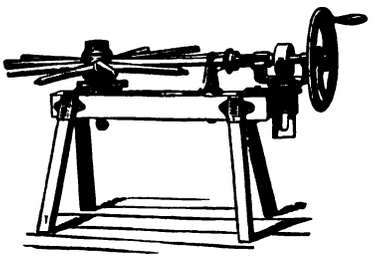
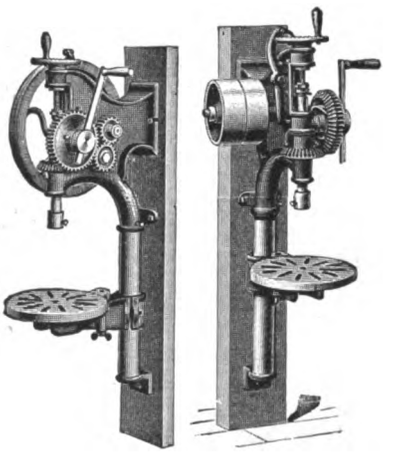


Fig. 718
SPOKE TENON MACHINE.



Figs. 744 and 750.
HAND and POWER DRILLS.

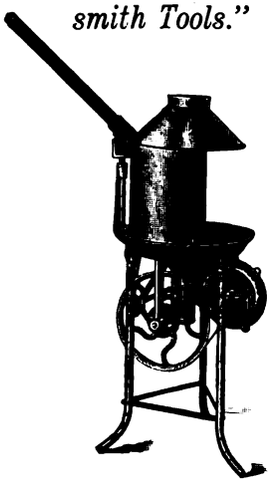


Fig. 904.
LEVER FORGE.

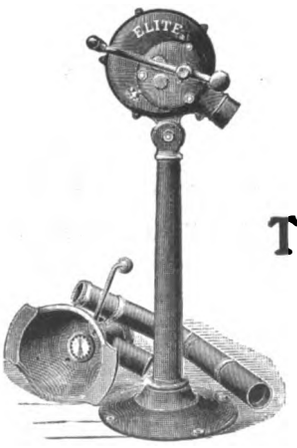


Fig. 900.
"ELITE" BLOWER.

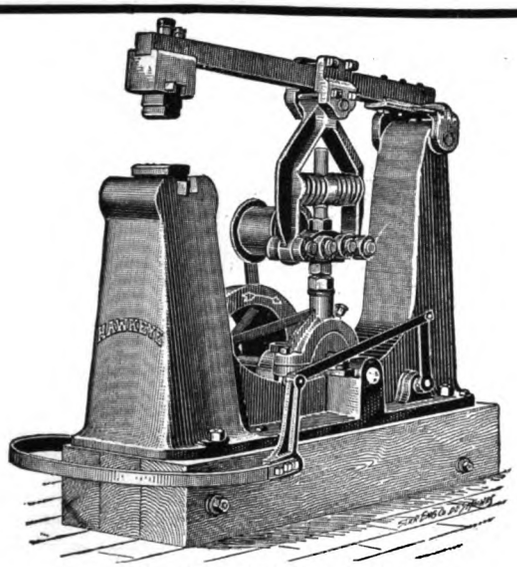
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CALHAN, Colo., Oct. 22, '06.

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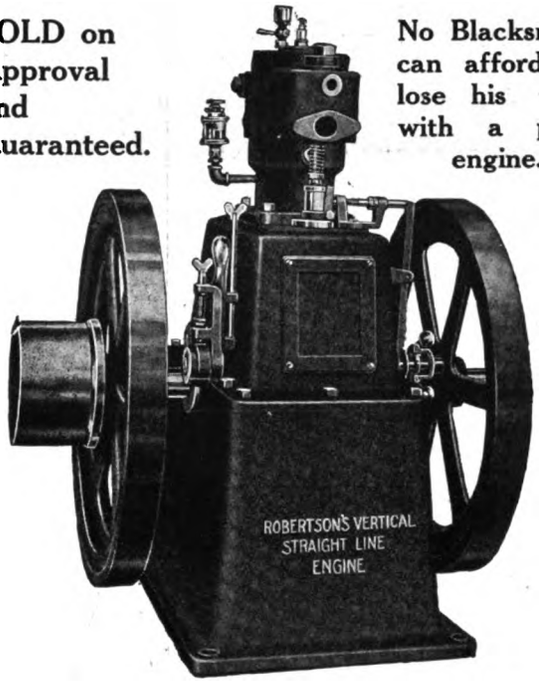
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A HIGH GRADE ENGINE

SOLD on Approval and Guaranteed.

No Blacksmith can afford to lose his time with a poor engine.



Vertical Sizes 3½, 5, 7, 10 H.P. up to 50 H.P.

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The Robertson Straight-Line Engines are strictly high class, made on honor, sold on merit. You can be the judge. It will pay you to write us today.

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Buffalo Punches Shears and Cutters

BUILT OF ARMOR PLATE—NO CAST IRON TO BREAK

TENSILE STRENGTH OF ARMOR PLATE 175,000 POUNDS, THAT OF CAST IRON 10,000 POUNDS. THINK IT OVER



Buffalo Punch and Shear No. 5.

SHEARS ANY LENGTH WITHOUT BINDING OR CRIMPING

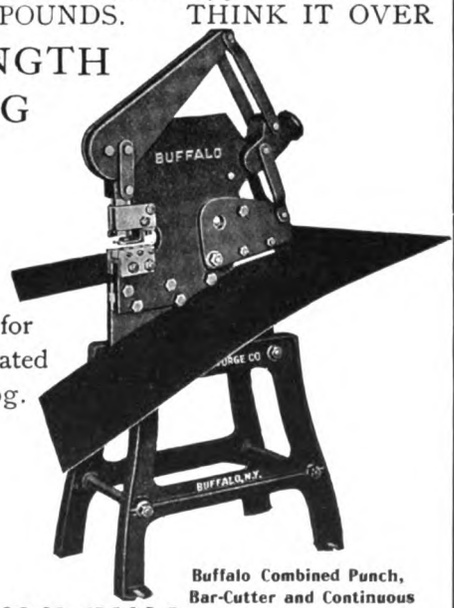
Thirty-five different styles. All capacities. Hand or power.

Sold by Best Dealers throughout Entire World.



Buffalo No. 12 B Punch.

Send for Illustrated Catalog.



Buffalo Combined Punch, Bar-Cutter and Continuous Shear No. 4½.

Buffalo Forge Company
Buffalo, N.Y.

THE CANADIAN BUFFALO FORGE CO., MONTREAL.

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"Woodpecker" GASOLINE ENGINES

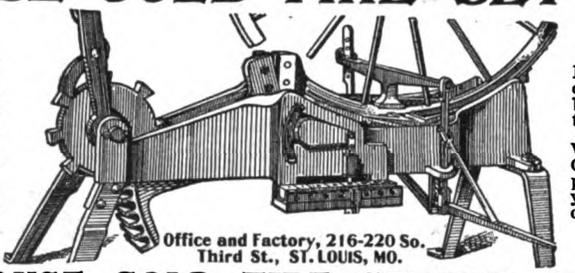
NO TROUBLE
Starting, winter or summer.
With experts or experiments.
With foundation or connections.
With poor adjustments.
With bad mixtures.
With faulty ignition.
With expensive repairs.
With unfair factory.

3½ H. P. 7 H. P. 14 H. P.
Ready to Run on Gasoline or Alcohol.

Send for Catalogue, Prices and Free Trial Plan.

WOODPECKER, 4th St. Office, MIDDLETOWN, OHIO.

HOUSE COLD TIRE SETTER



Nearly 3000 have been sold, none of them broken up or abandoned, but all in use today. This proves that ours is the only successful Cold Tire Setter in the world.

Don't be deceived into buying anything else.

Write us for Catalogue and prices. Free to you. Send today.

Office and Factory, 216-220 So. Third St., ST. LOUIS, MO.

HOUSE COLD TIRE SETTER CO.

PIKE'S SOLUS VETERINARY MEDICINES.

PIKE'S SOLUS HOOF OIL.
For dry, contracted and pinched feet. Will soften the dryest hoof in a few days.

PIKE'S SOLUS THRUSH CURE.
Guaranteed to cure any case of Thrush or money refunded.

Write for Catalogue and Special Offer Card.

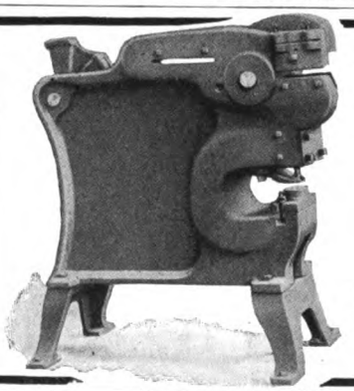
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70 COMMERCIAL ST.,
Boston, - - Mass.
Mention this paper.

WESTFAHL (MILWAUKEE) RASPS
Can't be excelled for durability. "Hand Punched."



Our new 18 inch rasp. Round ends.

Ask your dealer for the Westfahl brand. If he can't supply you write us your requirements
Mention The American Blacksmith,
WESTFAHL & CO., Milwaukee, Wis.



NO. 5 COMBINED PUNCH AND SHEAR.

Punches ⅝ in. hole through ⅝ in. iron.
Shears 5 in. x ½ in. flat iron bars.
Sheors 1¼ in. round iron bars.
Shears 8 in. x ¼ in. band iron.

Our large descriptive circular will interest you. So will our price.

Badger State Machinery Co.
19-25 Trinity St. Janesville, Wis.

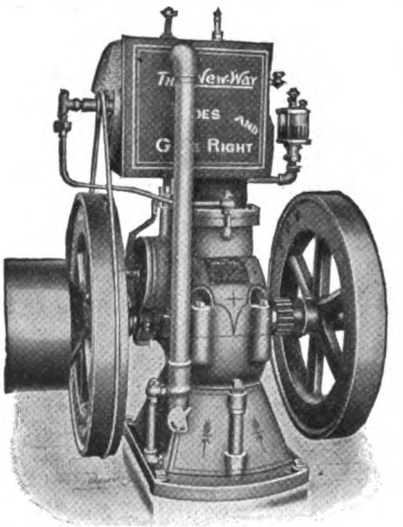
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THE "New-Way" AIR COOLED

Is the Only GASOLINE ENGINE

Built especially for Blacksmiths' Use.

3 to 7 H. P. Horizontal and Vertical.



Look at the other engines first. Note the multitude of rods, springs and triggers described as **simple.** Remember that the water tank (always left out of the cut) has to be filled and emptied every winter day. To forget it once may mean a ruined engine. Remember that water cooled engines all have packed cylinder heads. Packing leaks and blows out. Inevitable trouble and loss of power sometime.

THEN LOOK AT AN ENGINE THAT IS SIMPLE

THE "New-Way"

One piece cylinder—no chance to leak—grows stronger with use. Everything enclosed—no frail parts—no water—not a piece of packing or a gasket in it—no gasoline pump troubles. It absolutely cannot be overheated under full load—any temperature—any length of time. Your judgment tells you to

WRITE FOR CATALOG "K." DO IT NOW.

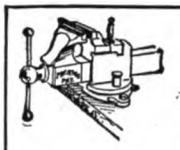
60 Sheridan St.

THE "New-Way" MOTOR COMPANY
LANSING, MICHIGAN, U.S.A.

60 Sheridan St.

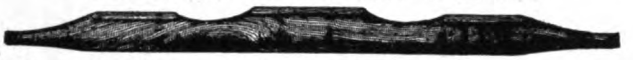
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Horse Clipping Machines.
Hand, Steam, Gas or Electric Power,
Send postal for Catalog.
Chicago Flexible Shaft Co.,
186 Ontario St., Chicago, Ill.



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ALL STYLES AND SIZES
FOR ALL USES
LARGEST LINE IN THE WORLD
ILLUSTRATED CATALOGUE FREE
PRENTISS VISE CO
44 BARCLAY ST. NEW YORK.

TURNED HICKORY AXLES



The above are all rear axles and are used for front by cutting center offset out. Ends are not fitted to any make skein, but are left full in order that enough wood may be had to fit to all skeins.

THE ENTIRE LENGTH IS FIVE FEET, SEVEN INCHES.

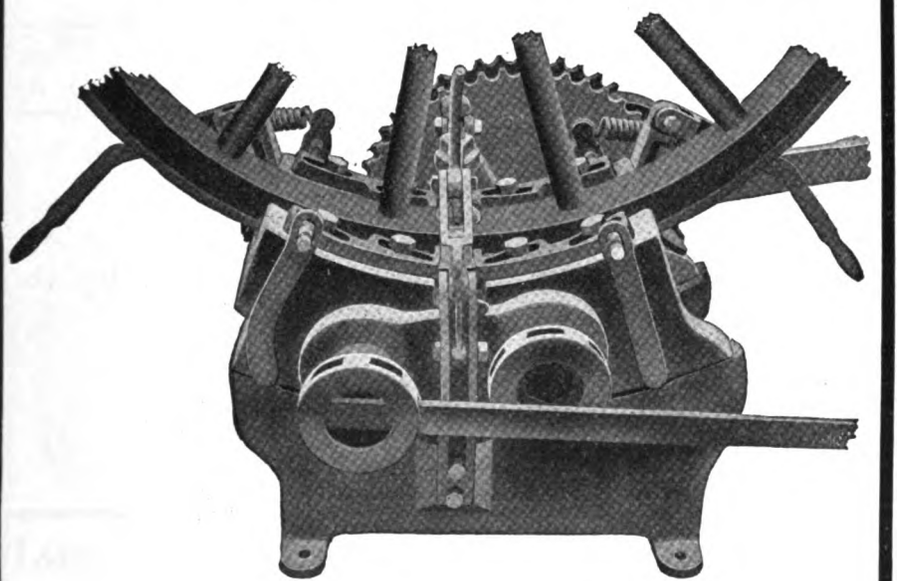
For Skein	Price Each	For Skein	Price Each
2¾ in.	$1.15	3¾ in.	$2.00
3 in.	1.30	4 in.	2.25
3¼ in.	1.50	4¼ in.	2.50
3½ in.	1.75	4½ in.	2.75

PROMPT SHIPMENT FOR CASH.
F. F. BOWN MFG. HOUSE, 1216 West Carson Street, Pittsburg, Pa.

ARE YOU AWAKE

to the fact that your customers can be organized into a body of ardent advertisers for you? **THE BROOKS WILL DO IT?** Every customer concedes its superior work over all others and knows that it cannot be duplicated in any other way. They are so well pleased that they talk it to their neighbors and they become your customers and advertisers, thus it forms a growing chain of advertisers for your business. Nothing can be added to your shop that will increase your business as the Brooks will. Boom your business by getting one now. It is the acknowledged superior of every other make. It is the only one that has stood the Government tests and in use in the United States Government shops.

The Brooks Cold Tire Setter



Adopted by the United States Government
Sets tires 4½ inches and all smaller sizes

once in your shop, eliminates all chances for a miscalculation and dissatisfied customers. They all become your advertisers and talk your machine.

The Brooks is the most durable and most powerful machine ever offered to the trade. It has an automatic grip key tightening device, which no other machine has. It is mechanically constructed in every detail. It is the result of the long experience of the oldest builders of edge grip cold tire setters. Our machines far excel anything ever built in the cold tire setter line. No other machine does its work so well, so easily and so quickly and is as durable. Our descriptive booklet, special terms and a handy vest pocket memorandum book sent free for the asking.

THE BROOKS TIRE MACHINE COMPANY
121 North Water St. WICHTA, KANSAS.

THE
BLACKSMITH
THAT BUYS THE
MONARCH DISC SHARPENER
GETS THE BUSINESS.

Don't let your Neighbor Do it First



See the Chips fly and watch the Dollars roll in.

ORDER NOW and Cinch the Trade in your Section.

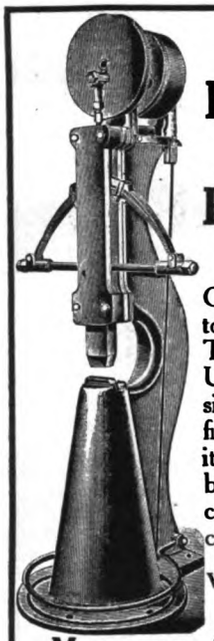
The Wonderful Work that this Machine does can hardly be believed—but seeing is believing. . . . . .

REMEMBER it was designed by a practical smith and is made by the oldest and largest Iron Works in the West.

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The MURRAY Iron Works Co.
BURLINGTON, IOWA. U. S. A.

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THE PERFECT POWER HAMMER

Maee in 3 sizes.

Only one horse-power to run it. The best Trip Hammer in the U. S., by reason of its simple construction, efficiency and durability. Used exclusively by some of the largest carriage builders in the country.

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Macgowan & Finigan Foundry & Machine Co.

41-42-43 Gay Bldg. ST. LOUIS, MO.

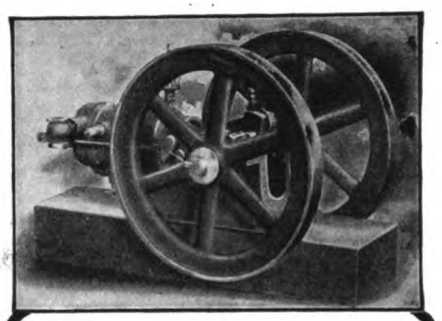


Always the same report.

"PIKE CORUNDUM WHEELS

are the best for Foundry use and Tool grinding. Cool, free and fast cutting." Made of highest grade Corundum obtainable. Every user of a Pike Corundum Wheel is insured against accident by the Casualty Company of America. **Send for new illustrated Catalog.**

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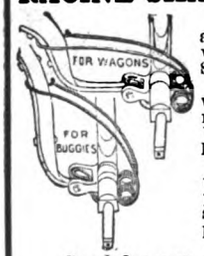
¶ The engine built especially for the blacksmith shop, built by skilled engineers. We have had over **50 years** of successful experience in this line.

¶ Our engines are all guaranteed to give perfect satisfaction. All parts are made heavy and strong, having the lasting qualities of good material and good workmanship. Made in all sizes from 3 h.p. up.

Our Complete Catalogue free upon request. Write for one today.

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RACINE SHAFT SUPPORTS



The only Shaft Support and Anti-Rattler that will work on both Buggies and Spring Wagons.

No wear on harness. No wear on horse's back, and no Anti-Rattler required. Will hold the shaft at any height.

Ask your jobber for them. If he cannot supply you, write us for descriptive circular and prices.

Send for our complete Catalog.

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"TOOLS THAT WEAR." **HELLER'S** CELEBRATED AMERICAN HORSE RASPS, FILES AND FARRIER'S TOOLS.

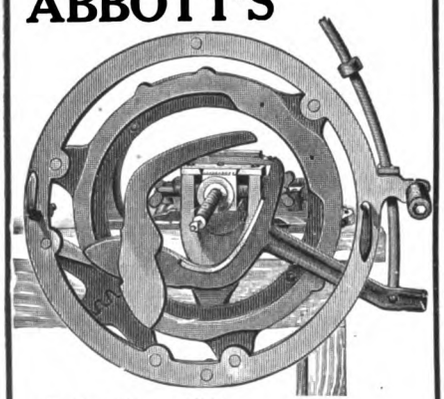
will save you Time and Money. Their Superior Quality sets a known and tested Standard of Excellence. All made from our own Production of Special Refined Clay Crucible Steel and Tempered by a Secret Process.



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Little Giant Hub Borers

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Made by ABBOTT & CO., Hudson, Mich., and sold by all Dealers in Carriage Makers' Machinery.

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"Every can a masterpiece" — made as if our reputation depended on it.

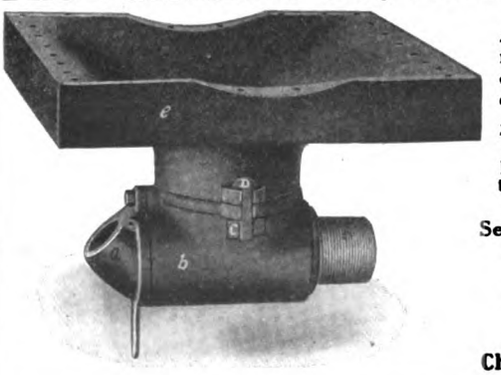
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Mfrs. of Colors, Paints and Varnishes
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The Vulcan for Tuyere Iron Has No Equal



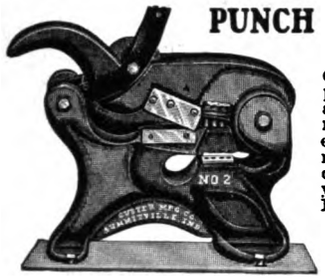
Are winning their way on the strength of **real merit.** New design based on long experience. Rapid heater and will not crack as others do. Cast in one piece. Automatic vent alone is worth price of Tuyere. Steadily increasing sales is proof that Blacksmiths know a good thing when they see it.

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Combines important points not known to any other machines made. The most powerful machine on the market. Drop us a card and we will tell you all about it.
For sale by jobbers.



THE HANDY TIRE BOLTER.

Handiest and most convenient wrench made. Each wrench is equipped with 3 size sockets, ⅛, ¼ and ¼.

CUSTER MANFG. CO.,
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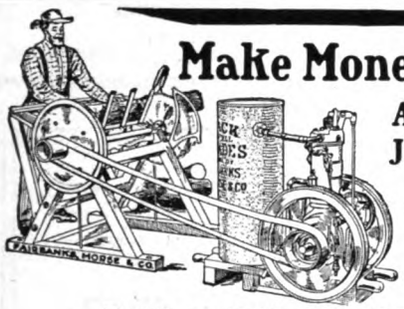
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INSIST ON GETTING A VICTOR—it 's making satisfied customers for us every day.
MASSACHUSETTS SAW WORKS, Chicopee, Mass.



Make Money Selling Our Engines

A Fairbanks - Morse Jack of All Trades Engine

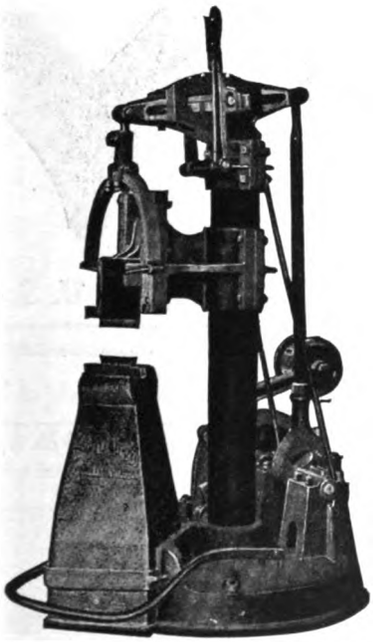
will run the machinery in your shop and **do its own selling** by demonstrating its superior qualities to your customers.

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Send for Proposition No. 487 AP.

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Modern Power Hammer



The ONLY hammer on which you can get a LIGHT BLOW at FULL SPEED.

The shifting lever controls the length of stroke.

Set it in any one of the five notches and then handle the hammer with the treadle the same as any other.

Actually five hammers in one.

Write any jobber or the

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No matter what your circumstances are, they will qualify YOU for *a better position, a higher salary, and a safe future.* The way is plain, easy, and sure for earnest men. It puts you under no obligation to find out how we can help you. Simply mark and mail the coupon below. *Can you afford to neglect an opportunity for advancement?*

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Please send me your booklet, "1001 Stories of Success," and explain how I can qualify for the position before which I have marked X.

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Elec. Railway Supt.	Ad Writer

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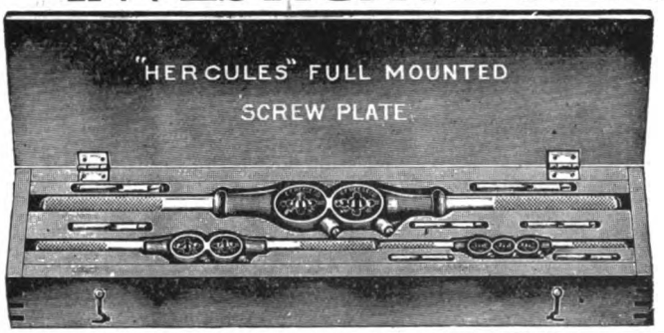
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Be sure you are getting value received. Skilled mechanics know that **Reece Improved** and **Hercules Full Mounted Screw Plates** are the freest and most accurate cutting tools made, finest in quality, yet lowest in price.

Have you a copy of our illustrated catalog and price list? If not, write today. Free for the asking.

THE E. F. REECE CO., GREENFIELD, MASS.

Your Hack Saw Troubles

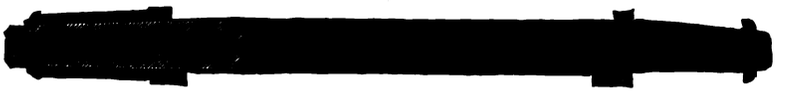
will come to an end if you get the old reliable Universal brand. Send for our free booklet with hints on the use of the hack saw.



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NEW HAVEN, CONN.

NATIONAL SELF-OILING STEEL TUBULAR AXLES

Now made of high carbon steel.



Guaranteed to be stronger and more rigid than solid steel axles. We make both. Write us

National Tubular Axle Co., EMIGSVILLE, PA.

Too Late Now to Set Tires

but it's time you were investigating for **next** Season — and remember **THIS** — our Machine is Ready to Prove its Claims in **YOUR SHOP.**

HENRY MAYERS MACH'Y CO.,
1721-23 N. 8th St. ST. LOUIS, MO.

Electric Forge Blowers Excel All Others

Write for Prices and Circulars

A Good Blower That Blows Everybody Good.

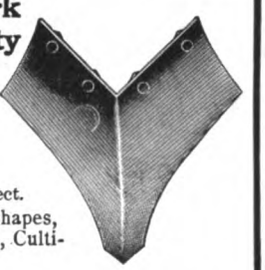


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ROTH BROS. & CO.
27-29 So. Clinton Street,
CHICAGO, ILL.

"CRESCENT" The Mark of Quality



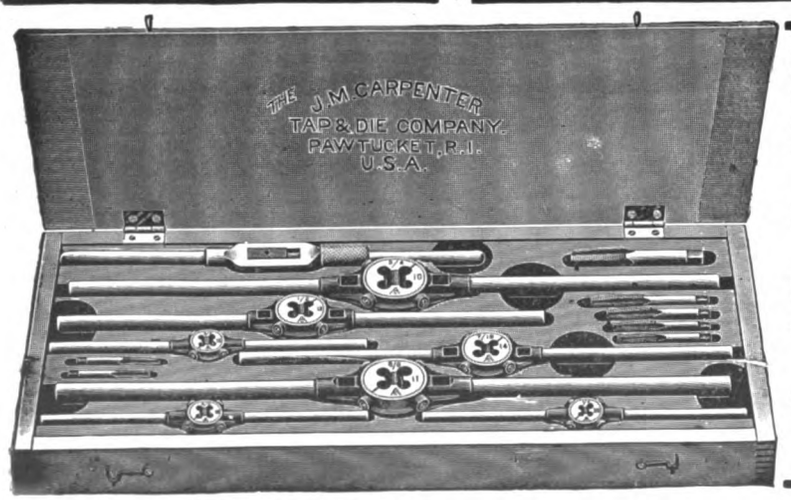


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We manufacture a full line of High Grade Agricultural Steel Shapes, Fitted and Bolted Plow and Lister Shares, Merchant Plow Shares, Cultivator Blades, Subsoiler Blades, Landsides, etc., etc.

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CARPENTER'S NEW FULL MOUNTED DIE SETS

With a stock for each die and the Original Nichols Tap Wrench.

Before buying a die set you should see **Carpenter's** and you will have no other make.

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The J. M. Carpenter Tap & Die Co.
Pawtucket, R. I., U. S. A.

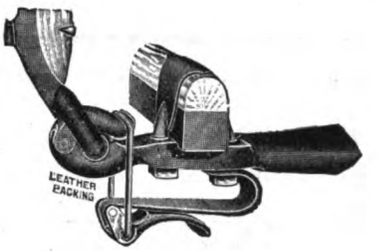
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BUY WHEELS DIRECT FROM THE FACTORY

We can save you money on all sizes of wheels; in the white, painted any color and with steel or rubber tires. We bore wheels for boxes without extra charge. Give us a trial order and we will make you one of our many satisfied customers. Write for special prices to *American Blacksmith* readers.

Carriage Wheel Supply Co.
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"WHATEVER is worth doing at all is worth doing well." The BRADLEY SHAFT COUPLING is made to do its work, not for a short time only, but as long as it is in service.

SPRING is of steel, oil tempered and tested.

ALL OTHER PARTS are drop-forged from steel—and no one makes stronger, cleaner or smoother drop-forgings than we do. In a

BRADLEY SHAFT COUPLING

all JOINTS are perfectly fitted, and every part is in perfect alignment—made so by special machinery. No carriage is complete without a BRADLEY and no carriage is too good for one.

C. C. BRADLEY & SON
SYRACUSE, N. Y.

Morse Twist Drill and Machine Company,



NEW BEDFORD, MASS., U. S. A.

Makers of Twist Drills and Machinists' Tools

SUITABLE FOR

Metal working factories, machine shops, railroad shops, ship yards, building contractors, bridge builders; also jewelers, electrotypers, model makers, bicycle and automobile repairers, carriage and wagon builders, cabinet makers, etc.

Increase Twist and Constant Angle Drills, Taps, Reamers, Chucks, Milling Cutters, Dies, Machines & Machinists' Tools.

Drills for Blacksmiths' Use, with Round or Flattened Shanks as desired.

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NOW

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A CALENDAR WORTH KEEPING.

And THE AMERICAN BLACKSMITH calendar for 1907 is certainly worth using every month of the twelve. Reproduced most artistically in ten colors,

"THE OLD OLD STORY"

PAINTED BY

Richard Van Fleet

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The American Blacksmith controls the use of this beautiful painting until 1908, but while we control the supply, every reader of The American Blacksmith, whose subscription is paid to or beyond January, 1907, will be presented with a copy of this beautiful painting in the shape of a most artistic calendar, 11¼ by 14¼ inches in size. If your subscription expires before January, make sure of getting one of these fine art calendars by renewing now.



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(1)	**50 Calendars, postpaid, (for subscribers only,)**	**$2.25**
(2)	" " **and one year's subscription,**	**3.00**
(3)	" " " **two** " "	**3.50**
(4)	" " " **four** " "	**4.00**

Prices include postage or express charges. But you will need to ***Speak Now.*** The supply is limited and some are sure to be disappointed, If you want a supply, order today. Remit by money order, express order or registered letter. The calendars will be forwarded three days after receipt of order, or if they are all gone when your order comes in, your money will be returned.

American Blacksmith Co.

P. O. Box 974. **BUFFALO, N. Y.**

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Reinforced DIAMOND Welds



USED ON ALL OUR POLES AND SHAFTS.

THE PIONEER POLE & SHAFT Co.

PIQUA, OHIO.

SEND FOR POLE AND SHAFT CATALOGUE AND PRICES.

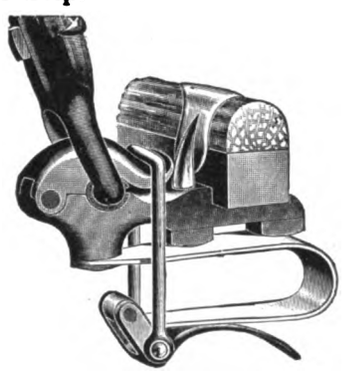
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ECCLES BALL-BEARING COUPLINGS

WITH LEATHER BUSHINGS

We make these Couplings in Buggy and Surrey sizes, and with Extension for Welding on an Axle Step.

Note how the Spring is fastened at the front end by a pivot, so that it can be TURNED FORWARD out of the way, while clipping the Coupling on the Axle.



PATENTED NOV. 25, 1902.

We make Wide Center Clips, both 5-16 and 3-8, and Square Clips for use with these Couplings, also Solid Forged Step Shank Clips.

The ease with which our Couplings are put on will save you money.

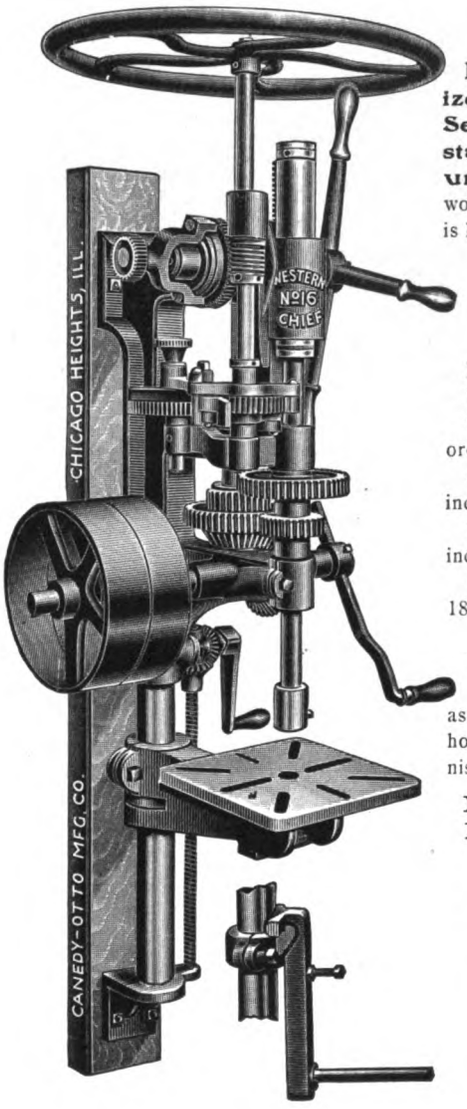
WE ARE MANUFACTURERS OF A FULL LINE OF

CARRIAGE AND WAGON FORGINGS

RICHARD ECCLES CO. **Auburn, N. Y.**

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No. 16 = Western Chief Drills = No. 17



DESCRIPTION

Hand Lever Feed, also Horizontal, Gear Driven Positive Self Feed, changeable instantly to fast, slow or medium speed as desired. These feeds work independent of each other and bit is lifted quickly.

Cut Gears.
Raise and lower device to table

Drills to center of 24-inch circle.

Bores from 0 to 1½ inch.

Takes Bits ½ or 41-64 Shank as ordered.

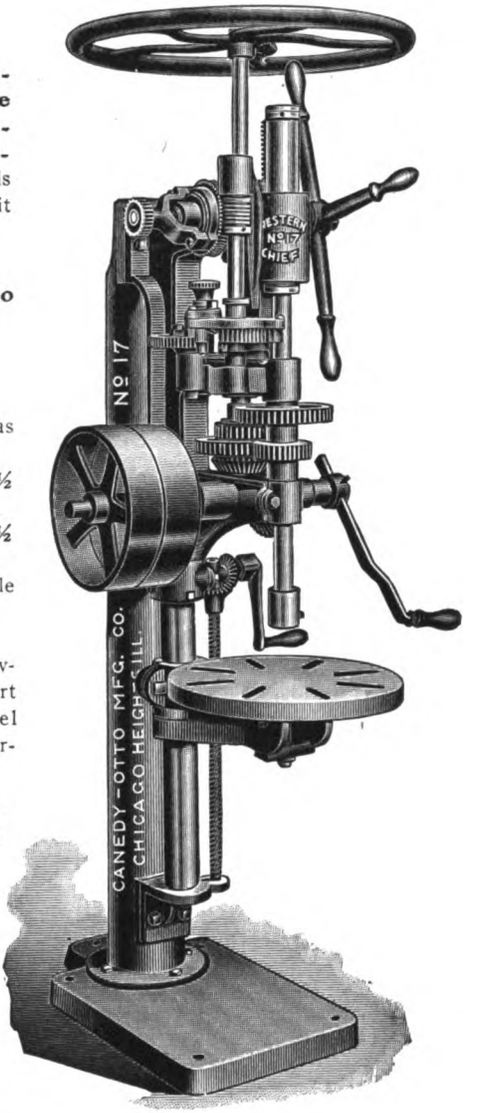
Spindle has up and down run of 8½ inches.

Table has up and down run of 15½ inches.

Greatest distance from table to spindle 18½ inches.

Wheel rims can be drilled by removing table and using the forked support as a wheel holder. A special wheel holder attachment as illustrated is furnished when desired.

No. 16, Weight 360 pounds
No. 17, Weight 560 pounds





Royal Blower

"The Successful Blower"

Gear case is oil-tight and dust-proof. Gears run in a continuous bath of oil. No spiral gears, worm gears or ball-bearings. Crank turns forward or backward. Fan 12 inches. Weight 135 pounds.

Fire pot is 8x9 1-2x4 inches inside. Needs no Clay.

Some

"Popular Tools"

Made by

CANEDY - OTTO MFG. COMPANY,

Chicago Heights, Ill.

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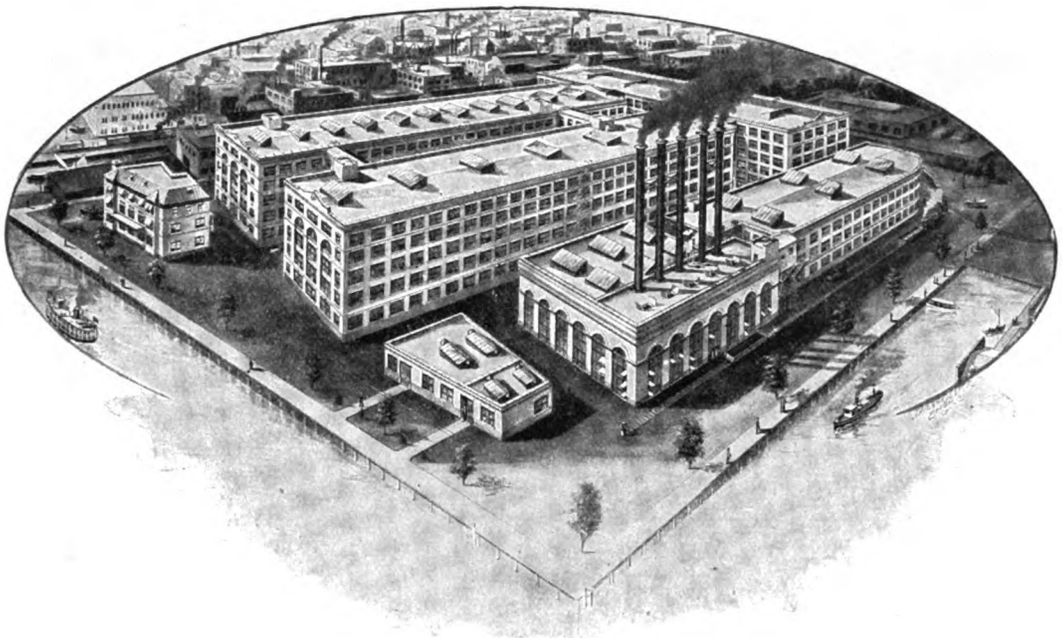
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EVERYWHERE.

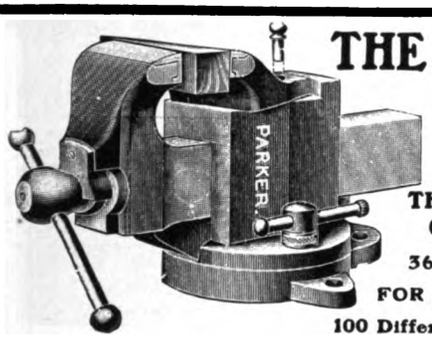
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MORGAN & WRIGHT

are in their new factory at Detroit



busy making good pads (and lots of them) for shoers who like that kind.



THE PARKER VISES

THE MOST RELIABLE ON THE MARKET

36 Different Styles,

FOR ALL PURPOSES,

100 Different Sizes.

Parker vises will be found in the best equipped shops in the country. No other vise has given to the trade such general satisfaction. Our new line of improved vises has reinforced sliding jaws, making the Parker vises stronger and more durable than ever.

Made of a blending of steel and best iron in the castings.

The steel faces on these vises are milled and fitted to the jaws and are removable. Have self-adjusting back jaws which automatically adapt themselves for holding wedge-shaped pieces.

STRONG DURABLE HANDY



Our complete illustrated catalogue is free. Write today for price list also.

A tool of many uses. Both round and pipe jaws interchangeable. Weight, 76 lbs.

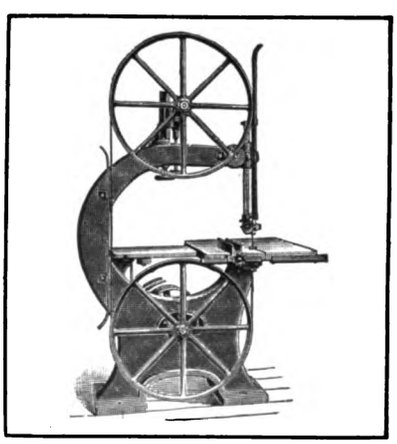
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YOU NEED Wood Working Machinery.

Wood Working Machines in your Shop will enable you to do better work and more of it than you can do with hand tools.

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Catalog describing a fine line of moderate priced BAND SAWS, SAW TABLES and JOINTERS mailed on request.

SEND FOR IT NOW.

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245 Main St. LEETONIA, OHIO, U. S. A.

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The Material Used in the Manufacture of Capewell Horse Nails

Is Specially Selected, Prepared and Inspected for Our Use.

The Popularity of "Capewell" horse nails is shown by the fact that there are more of these nails sold in the United States than of all other makes combined. Year by year there is an enormous increase in the demand because The "Capewell" is known to be the most Durable, Economical and Popular nail in the world.





Capewell Nails are the Choice of the Most Skillful Smiths in the Country.

Made by **The Capewell Horse Nail Company**

HARTFORD, CONN.

The Largest Manufacturers of Horse Shoe Nails in the World.

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Buffalo: . . . . . 11 Ellicott St.	Denver: . . . . . 1611 Blake St.
Cincinnati: . . . . 720 Main St.	San Francisco: **Santa Fe Warehouse, Spear St.**
Detroit: . . . . . 29-31 Farrar St.	Portland: . 554 Worcester BlocK.
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Catalogue Free upon Application.



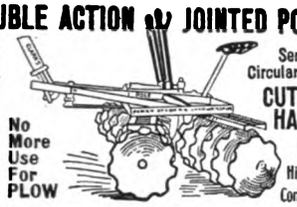
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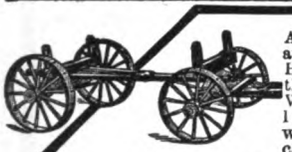
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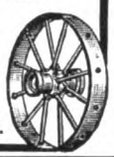


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Low Down Wagons

soon earn their cost on any farm.

Steel Wheels



for farm wagons. Straight or staggered spokes. Any size wanted, any width of tire. Hubs to fit any axle. For catalogue and prices, write to

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BY USING A

STANDISH FOOT-POWER HAMMER.

Takes the place of a helper. You can do more work and better work.



Our Power Hammers give perfect satisfaction wherever used and they are doing good work in the best shops in the country. Drop us a card and we will send you interesting descriptive circulars free. Write at once—today.

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COLUMBUS, O.



COLUMBIAN ALL-STEEL ANVIL

JUST AS OUR ANVILS AND VISES APPEAR WHEN FINISHED. WOULD YOU CARE TO SEE OUR NEW CATALOG NO. 16 THAT DESCRIBES THEM IN DETAIL?

COLUMBIAN WROT-STEEL SOLID-BOX VISE



The Columbian Hardware Company

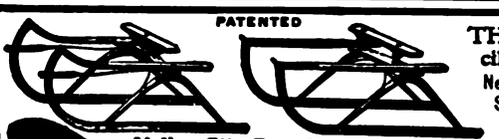
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168 Church St. NEW YORK — CLEVELAND, OHIO — 26 East Lake St. CHICAGO

Success Oscillating Sleigh Knees.

For farm, road and lumbering Bobs. Sizes, 1¼, 1¾, 2, 2⅜, 3, x 3½ in. runners. Satisfaction Sure. Try Sample Set.

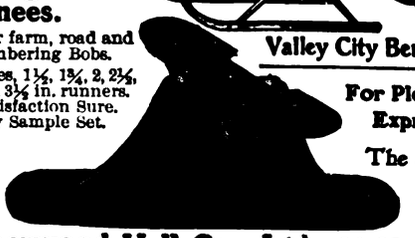
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Valley City Bent Knee Bob Sleighs

For Pleasure, Delivery, Express, Sleigh, etc.

The Strongest, Neatest, and Best.



THIS is the Brown Oscillating Sleigh Knee.

Needs No Recommendation. Satisfaction Guaranteed. Sizes, 1¼, 1½, 1¾, 2, 2⅜, 3 and 3½. Write for circular and prices on our complete line of sleigh goods.



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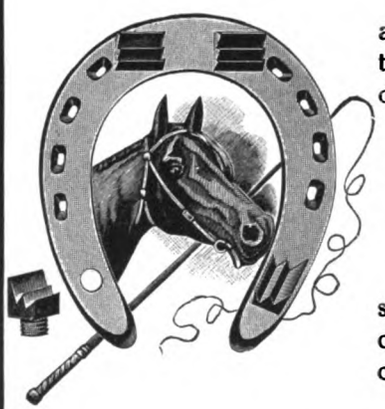
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Always Sharp Calks, we will send you a handsome booklet telling you all about

OUR CALKS



and why they are the most durable and satisfactory. They have been a great success throughout the snow-belt, and that is why

WE ARE



sure that if you try them, you will buy no other calk, for horses shod with "Always Sharp" calks, can be driven up hill or down,

GIVING THEM FREE

rein, no matter how slippy the road may be, it gives greater hauling power. We want you to try them

THIS SEASON

as we have improved our manufacturing facilities, reduced the price, and bettered the calk. We want you as an agent and will be pleased to answer all your enquiries, or send samples, enough to shoe your own horse if you wish, and convince yourself that there is no better calk.

ALWAYS SHARP CALK MFG. CO.

JERSEY CITY, NEW JERSEY.

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The Williams Drop Forge Company have made their line of CAN'T SLIP CALKS and SHOES for the season of 1906-7 much STRONGER than ever before. They are INTERCHANGEABLE with ALL OTHER MAKES of removable calks; but are, in point of merit, in a CLASS BY THEMSELVES. They will be sold only to the HORSESHOERS through the leading supply houses who are our regularly established agents, and direct from the factory where no agencies are established. All inquiries will be cheerfully answered by BITTENBENDER & COMPANY, sole DISTRIBUTORS, 128, 130, 132, Franklin Ave., Scranton, Pa.

THE HANDY GRINDER

occupies little space and will carry a wheel any size up to 10 inches in diameter



Net price of Machine without wheel $6.00

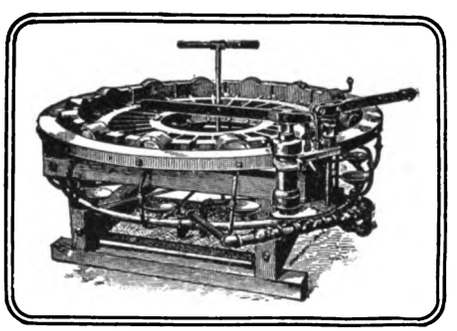
SHOULD BE IN EVERY SHOP

This machine weighs 34 pounds; has adjustable slide rest and self feeding oil cups; has babbitted bearings that are eight inches in length, and is well made in every particular. By having several different grades of wheels, a great variety of work can be done on this simple and inexpensive machine. Our line of grinding machines is complete. We can furnish Bench Grinders or Grinders on Stands to carry wheels from 6 inches in diameter to 36 inches,

Prices and Descriptive Matter furnished upon application. Write today.

VITIRFIED WHEEL COMPANY
WESTFIELD, MASS.

The West Hydraulic
Tire Setter



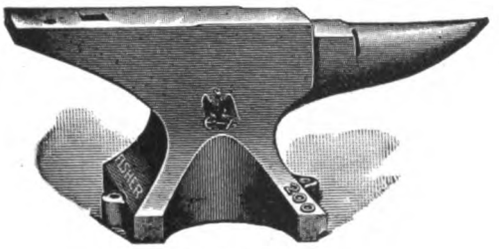
Is a **Round Machine** for tiring **Round Wheels,** and compresses the tire at all points—not all in one spot—and the compression is so slight at any particular point that tire bolts do not have to be removed when resetting an old tire, neither are holes closed so bolts are tight in tire. Wheel is made compact and joints tight.

WRITE US YOUR REQUIREMENTS.

The West Tire Setter Company
ROCHESTER, N. Y.

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"EAGLE"



ANVILS.

1843 1906

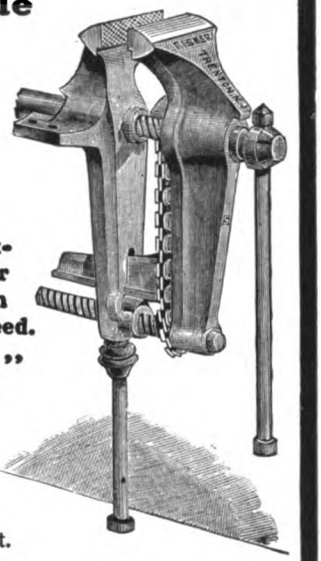
PIONEERS

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"Fisher" Double Screw Parallel Leg Vise

Is sold by Reliable Dealers Everywhere. For Strength and Durability there are none better made. The "FISHER" is acknowledged the Best for Blacksmiths.



We have had over sixty years Experience in this line and offer you the most reliable Anvils on the Market. Every one Guaranteed.

WE BELONG TO NO TRUST--one blow on an "Eagle" anvil is worth two on any other anvil MADE

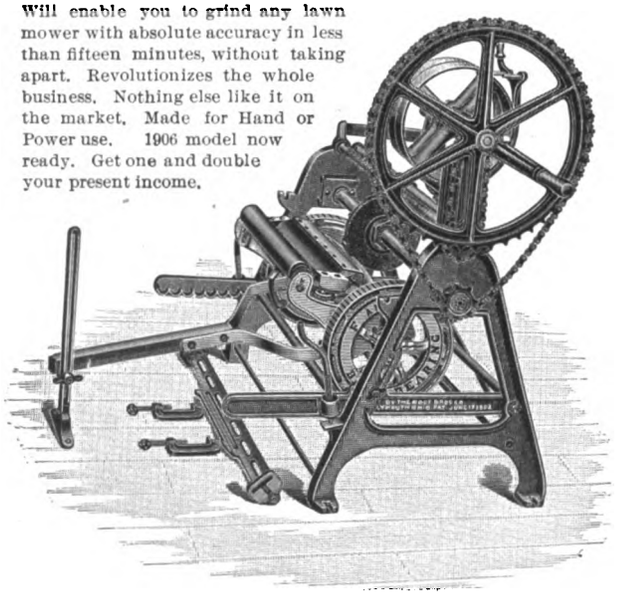
The Face Consists of a Single Piece of the Very Best Cast Steel Perfectly Welded and of the Hardest Temper. The Horn is made of Tough Untempered Steel and will neither Break nor Bend. All "Eagle" Anvils made with the Latest Fisher Patent Double Thick Steel on Both Edges of the Face. Made in all Shapes and Sizes up to 1300 lbs. Weight.

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The "Ideal" Lawn Mower Grinder

Will enable you to grind any lawn mower with absolute accuracy in less than fifteen minutes, without taking apart. Revolutionizes the whole business. Nothing else like it on the market. Made for Hand or Power use. 1906 model now ready. Get one and double your present income.

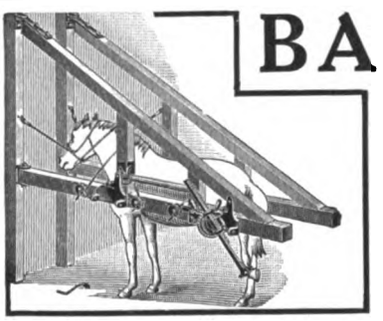


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In use in all modern shoeing establishments, because they fill every shop requirement and give satisfaction everywhere. Everyone fully guaranteed. All the objectionable features of the cheap stocks eliminated.

BARCUS STOCKS are simple, strong, solid, safe and sure to hold. No ropes or pulleys to tangle or break; no bracing to roof or floor, but furnished complete ready to bolt to the stationary posts in your shop. You can rely on

Barcus Stocks Every Time.

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MR. GEO. BARCUS:—I wish to say that the horse rack we bought of you gives perfect satisfaction in all respects.

Yours respectfully, HODGINS & DOUGLASS.

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ROWE PATENT CALKS





THERE ARE NO OUTS

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ONLY CALKS WITH REAL SHOULDERS AND REAL STEEL CENTERS

The great distinctions between Rowe Patent Calks and other calks are two. Rowe Calks have real shoulders and real steel centers. ¶ No other calks have perfect, even shoulders that press against the shoe and act as pinch-nuts. Other so-called shoulders are jammed, broken and rounded in the forging or in the threading. ¶ Rowe Calks are turned from solid bars by machinery and their threads are run clear out without injury to the shoulders. The Rowe Patent makes this possible. ¶ Rowe steel-centers are welded and run from end to end. They form integral parts of the calks. Other steel center calks are substitutes, made by inserting short lengths of steel wire into the points of the calks. They won't wear.

DON'T TAKE OUR STATEMENTS---INVESTIGATE

For these reasons Rowe Patent Calks are guaranteed to wear better and longer than any other steel center calks. We sell upon merit only and

MONEY WILL BE REFUNDED

if our claims do not prove true.

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The Rowe Patent Calk Co.

HARTFORD, CONN.

Endorsed by Master Horseshoer's N. P. Association.
Sold to Horseshoers only.

Send us the names and addresses of your customers and we will mail each an attractive booklet, bearing your name and busines in a prominent position.



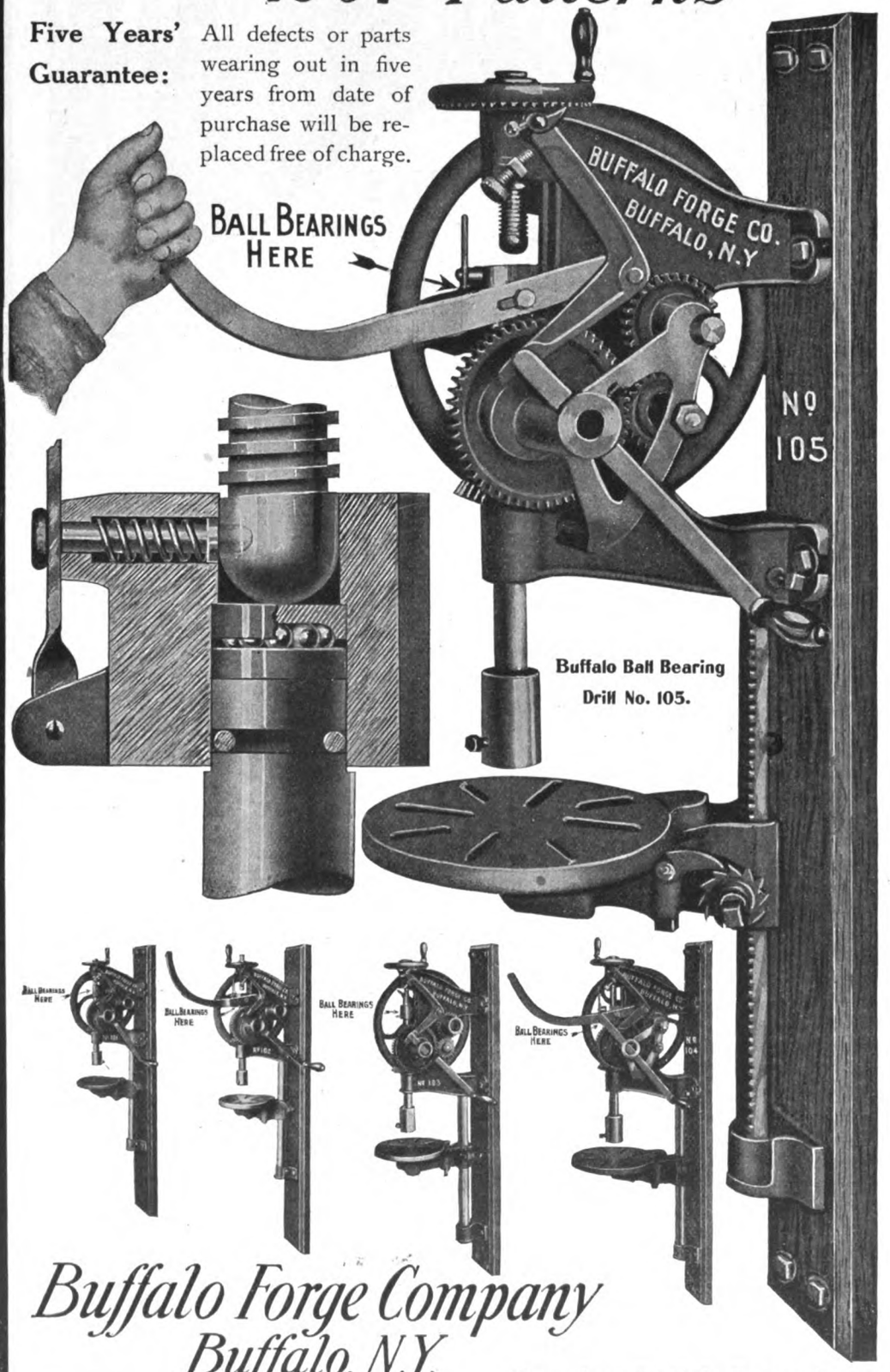


Guaranteed to wear longest

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Buffalo Ball Bearing Drills
1907 Patterns

Five Years' Guarantee: All defects or parts wearing out in five years from date of purchase will be replaced free of charge.



Buffalo Ball Bearing Drill No. 105.

BUFFALO 1907 DRILLS.

5 Sizes
5 Capacities
5 Prices
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Designs are
New
Strong
Simple
Durable
Original
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Practical
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Extra Heavy

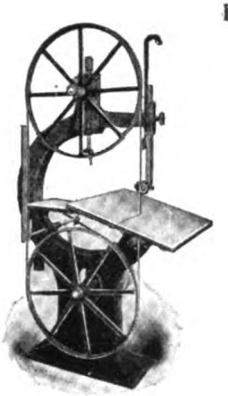
Features:
Two Speeds
Lever Feed
Quick Return
Slotted Table
Ball - Bearings where they count, on the high speed spindle, ***not*** on the slowly rotating feed mechanism.
No Lock-Nuts to take the thrust – Buffalo 1907 Drills are free from these by-gones.
Pin Clutch; Nut Closing Devices avoided.
Combination Lock - Nut, Ball - Bearing & Pin Clutch.
Bearings ***bored*** and ***reamed*** in solid metal, no liners used.

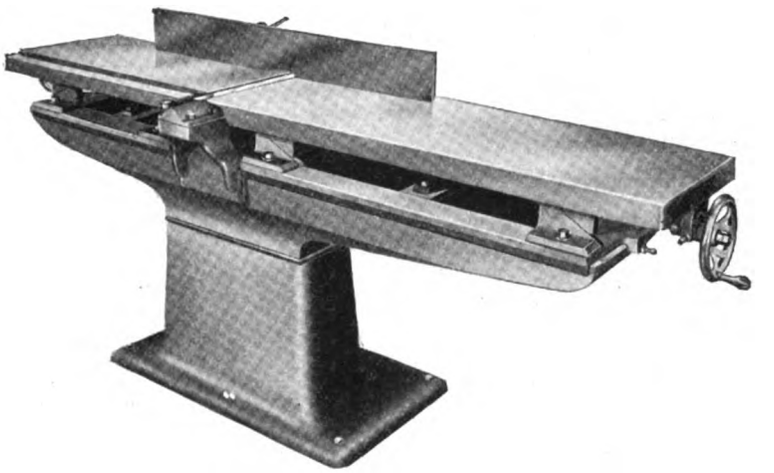
Buffalo Forge Company
Buffalo, N.Y.

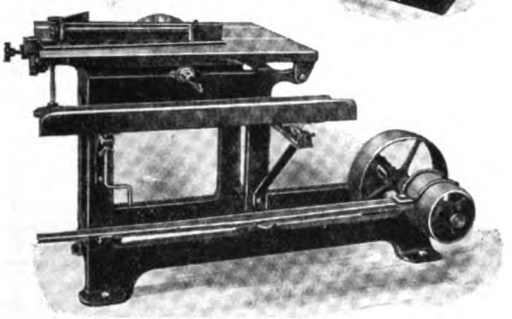
Canadian Buffalo Forge Co., Montreal, Canada.

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Band Saws
Cut off Saws
Swing Saws
Rip Saws
Jointers
Lathes







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The Sidney Tool Co., Sidney, O.

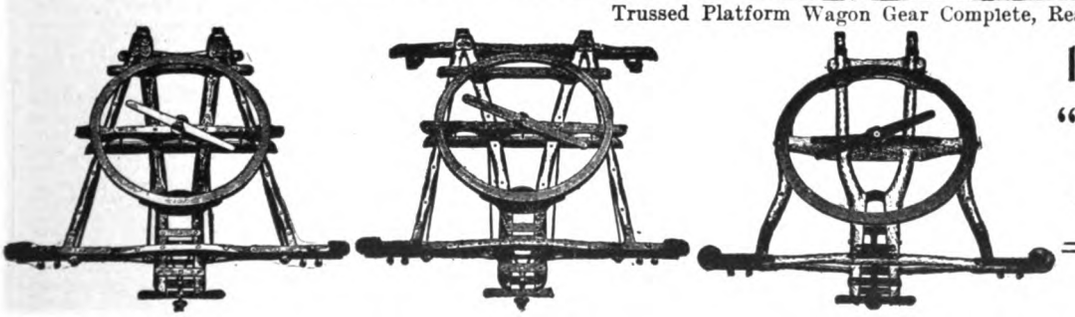
Complete GEARS

As shown herewith, ready to receive body, for light and heavy work, can be furnished promptly.
In ordering, give full specifications, or such descriptions as will enable us to make up specifications.

Also Combination and Three-Spring Gears in several styles.



Trussed Platform Wagon Gear Complete, Ready for Body.



1,000 Styles and Sizes

"Selle Gears"

Write for Catalogue A

THE AKRON-SELLE GEAR CO.

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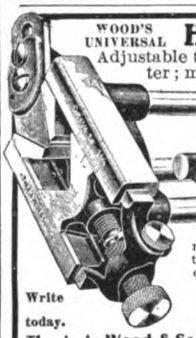
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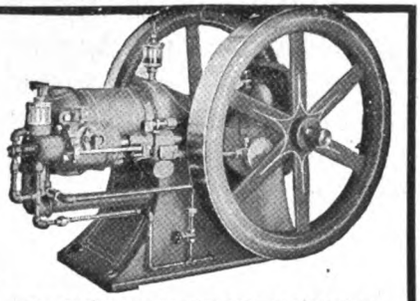


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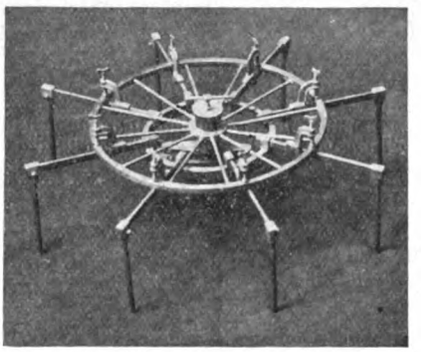


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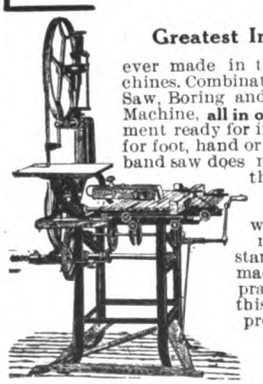
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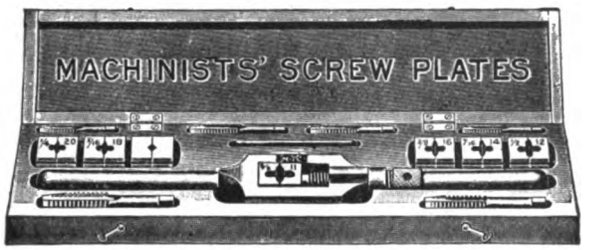
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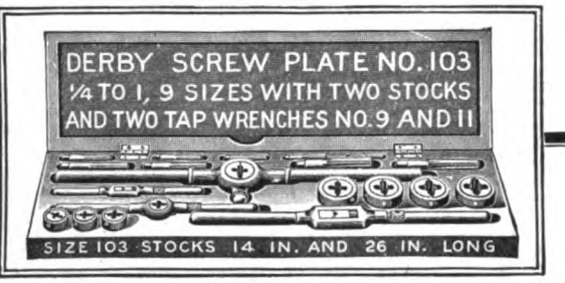
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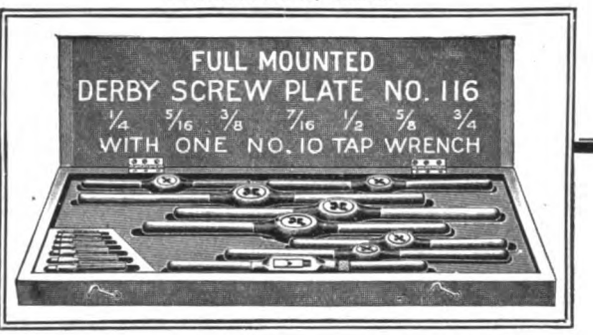
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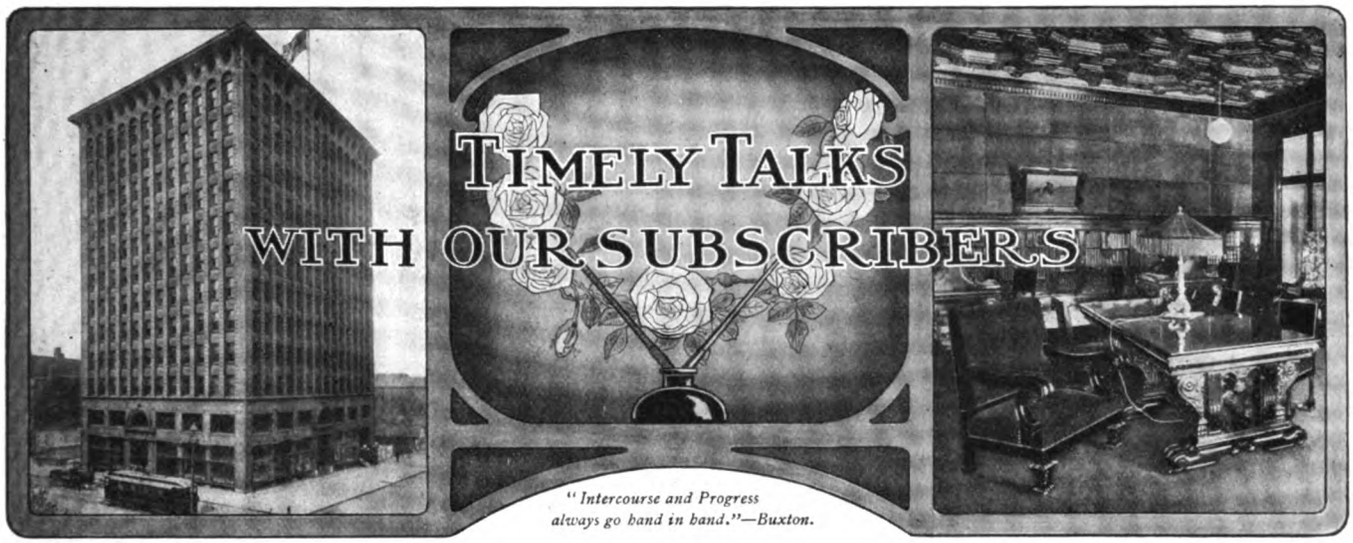
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You have probably noticed that, instead of referring to the 24 inside pages of "Our Journal" as "reading pages" we prefer to call them "Editorial Pages," and you have perhaps been a little puzzled over our change. It is just this, we feel that every page of "Our Journal" is a reading page. The advertising section, as well as the editorial section, is of vital interest to the craftsman. So, in speaking of the editorial pages, we refer to the 24 inside pages of "Our Journal," thus distinguishing them from the other reading pages usually known as the advertising section.

Some of our readers will undoubtedly make a collection of the frontispieces which have appeared and will appear in "Our Journal" regularly each month. In this connection we wish to say that it will not be necessary for you to mutilate your copy of the paper to secure these pictures. The circulation department will each month have a supply of these pictures printed exactly as they appear in the paper, bearing no printed matter on the back, and copies can be secured at the very low price of 10 cents each, including mailing and packing. These pictures should make excellent subjects for the decoration of the shop, or for the office, and will show your customers that you are up-to-date and progressive, and that you are keeping constantly in touch with craft matters. For instance, the picture of the horse which appears as the frontispiece in the November paper, neatly framed and hung in the shop, will show your customers that the horseshoer is not merely a person who removes a piece of iron from the animal's foot, cuts at random an amount of horn from the hoof, and then replaces another piece of metal. The horse owner visiting your shop will know that you are constantly studying the horse's foot, and that your aim as a shoer of horses, is not merely to get the owner's dollars, but to shoe his horse as the animal should be shod.

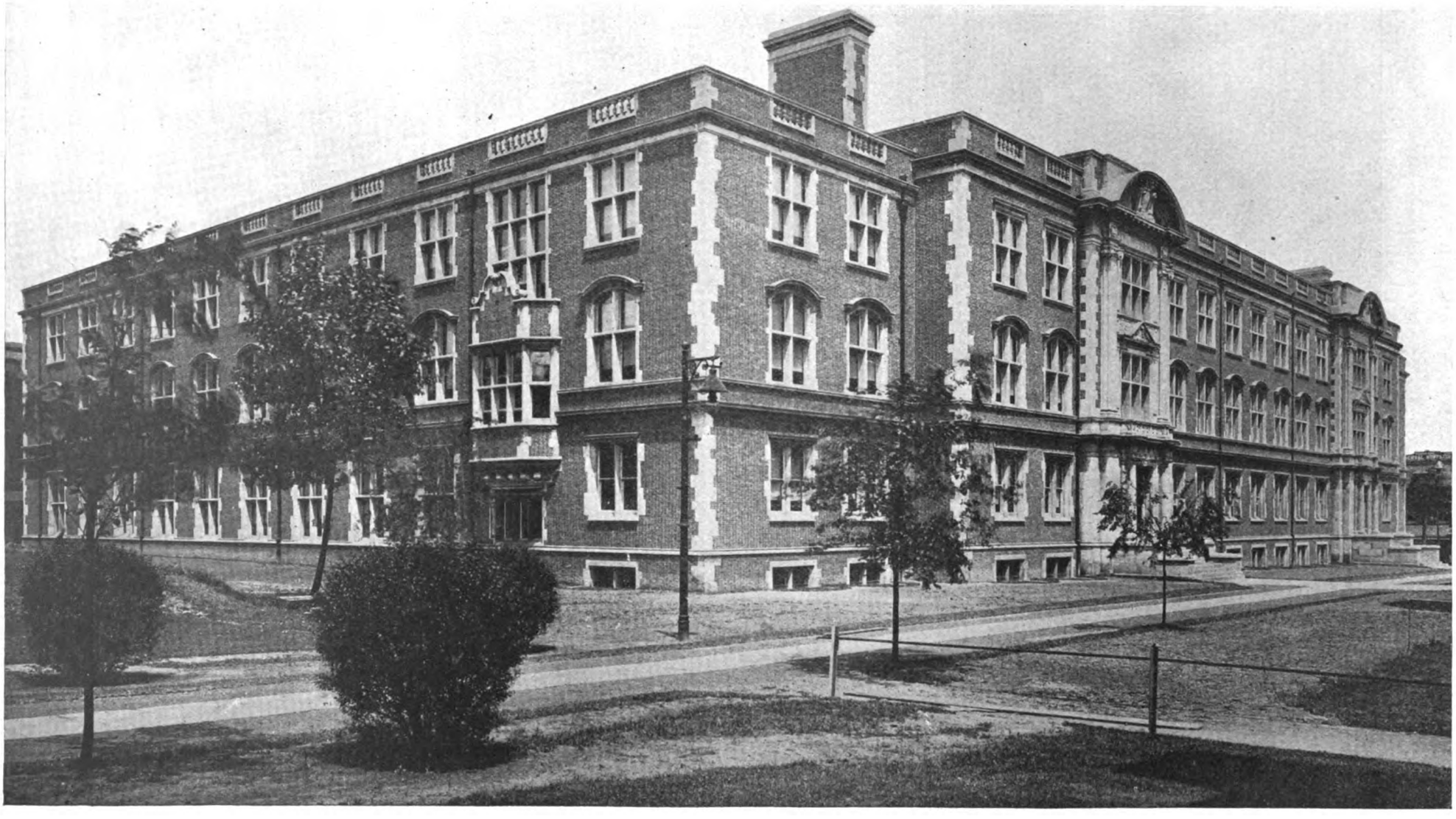
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There are still a few lots of 1907 calendars for those who have not yet sent in their orders. Better advise us immediately of the quantity you will need at New Year's time. If your order is not received within the next week, you will likely be disappointed. The calendar subject this year is without question the finest that we have ever issued, and the demand for them exceeds by far that of any previous year. So, let us have your order now; there is no advantage to be gained by waiting. We are now able to deliver calendars within three days of the receipt of your order. So you need not hesitate to send in your order fearing that the calendars will not come in time. But send your order now. If you want to mail them to your customers, we can supply mailing tubes at the small price of one cent each. But we cannot guarantee delivery unless your order is received immediately. Send your order today if you wish to present a calendar to each of your customers.

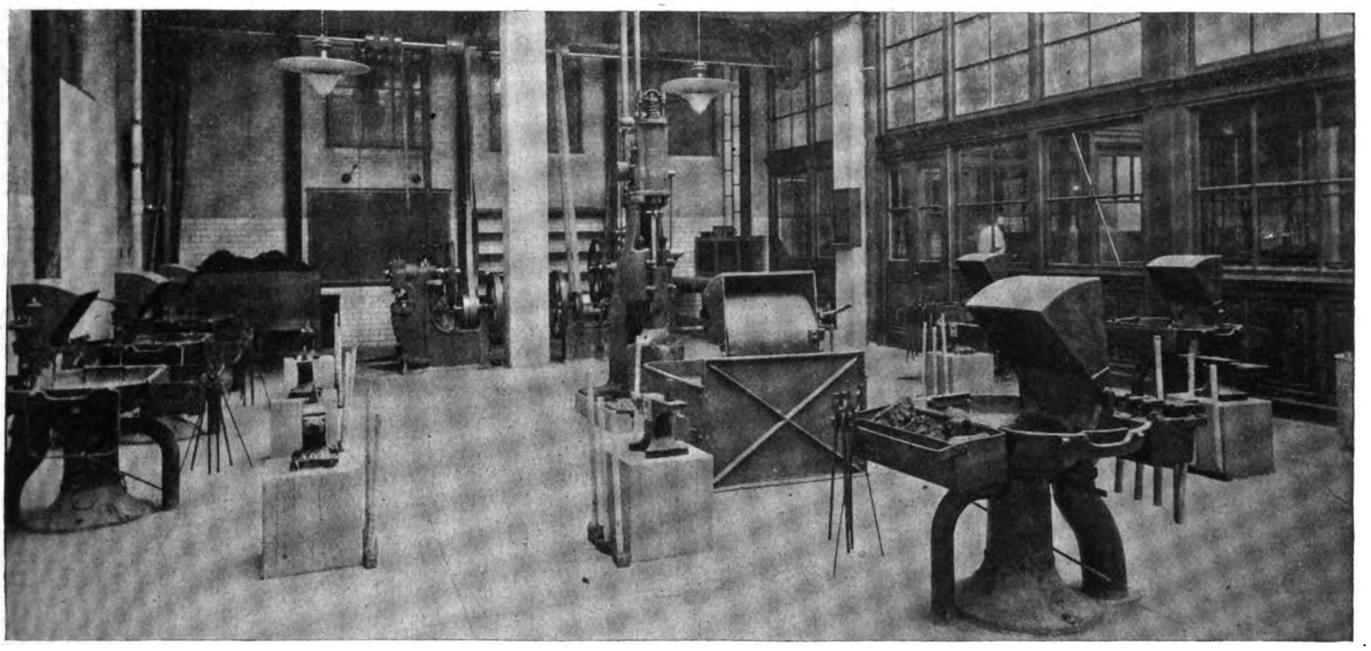
Within the past month several requests for change of address have been received, and, as quite a number of these notices did not contain the old address, we desire to again advise our readers that this is absolutely necessary. When you understand that all subscribers are indexed according to their residence, and not their name, you will know why it is necessary for us to have both your old and new addresses to give your change of location proper attention. We should also prefer to have our readers notify us direct, and not to leave this important duty to the postmaster, as the notification is most likely to reach us if the reader takes it upon himself to write. Several cases have recently come to our notice where the postmaster has either been too busy to attend to the matter, or it had slipped his mind. A notice regarding change of address is printed every month at the head of this page, but we want our readers to bear in mind that the old address is almost as important as the new one.

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THE FORGING DEPARTMENT AT THE UNIVERSITY OF PENNSYLVANIA.



THE engineering department of the University of Pennsylvania was established in 1874, but the constant increase in the number of classes in the department has necessitated their moving into more spacious quarters three times since their founding. The department this year has a total enrollment of nearly 600 students, and a teaching force of 40. The new quarters, which will be occupied this fall, are believed to be the finest and most complete of their kind for receiving instructions in engineering.

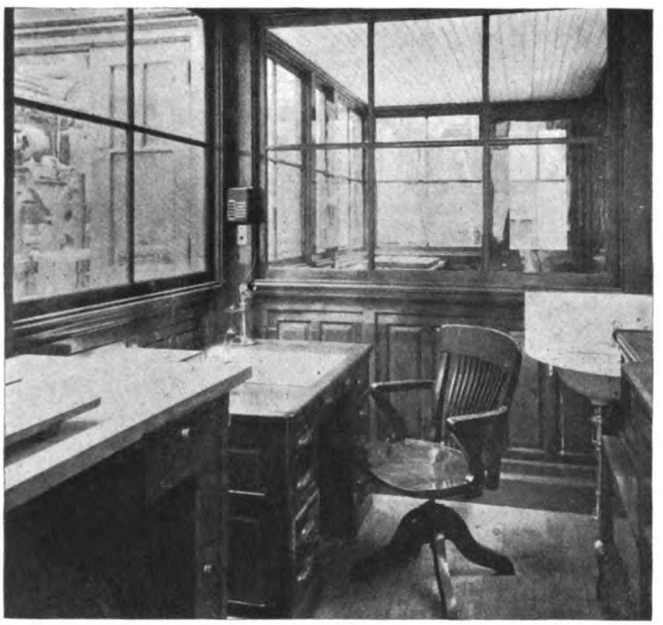
The new building is the largest of the university group of 70, and the approximate cost, including equipments, was nearly a million dollars. It is of fire proof construction, and the equipments are of the most modern and improved type. There are three stories, with basement, which include about one-third of the entire building.

The forge shop, foundry, and iron work departments are located on the first floor. Here are about 12,000 square feet of space devoted to shop work. This space is divided into wood and pattern shops, iron and machine shops, and foundry and forge shop. These shops are arranged for handling 15 men at one time, or a total of 90 in all the classes. All the shops are supplied with a modern equipment of tools, the pattern shop having a band saw, a jig saw, a jointer, a planer, a cross cutting saw, a banding machine, etc. The foundry has a large moulding trough, a 22-inch cupola, two brass furnaces and a large molding floor. The iron shop has 14 lathes, besides drill presses, vices, etc. The machine shop has two drill presses, a cutter grinder, an emery grinder, nine moderate sized lathes, three milling machines, two shapers, two planers, one screw machine, and numerous other small tools. The forge shop contains 10 Buffalo down-draft forges, and an extra large forge, to serve a 250-pound steam hammer, a 5-horse-power motor direct connected to blast fan, nine 100-pound anvils, a large water trough, a 16-inch drill press, a 12-inch emery wet grinder, a power punching machine, a power shears, a 6-inch pipe cutting and threading machine, a large bench with two vises, two electric soldering irons, two pipe-vise stands, and numerous other tools for the use of the engineering student. The machines in the forge shop are run by a 5-horse-power motor connected to the line shaft.

For all shop work the most modern appliances have been supplied, so that the student may rapidly learn the quickest and best method of making patterns, molding, casting and finishing them in the machine shop, and for the proper handling of materials in the fire and on the anvil. A repair shop is located on the second floor, where all broken appliances are repaired and much new apparatus manufactured. The equipment is complete both for wood and iron work, and all of the tools are motor driven.

The work in the forge department is strictly machinery blacksmithing; ornamental and house work has no place in the field of the prospective engineer. The student begins by learning to make up a stock, bend simple forms cold, and then by manipulating the same types of forms from heavier stock heated. The work is then drawing down and expanding weldless shapes. Up-setting follows on jobs requiring lap welding, butt welding, angle welding and T welding. In connection with these various steps in the manipulating of metal, the student is also taught the use of fluxes and how to calculate stock,—hardening, tempering, annealing and case hardening, and the dressing of chisels then follows.

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THE INSTRUCTOR'S OFFICE IN THE NORTHWEST CORNER IS ROOFED OVER AND IS OF CLEAR GLASS ON ALL SIDES

Considerable brazing is done, and some soft soldering and sweating. Pipe bending and the forming of regular shapes in copper and brass from sheet metal are followed just sufficiently to cover the simpler operations of coppersmithing. The various splices used in electrical work are also made in the forge shop. Small columns and girders are also made up from the structural shapes within the capacity of the punch and shearing machinery, and jigs are made use of in this work when possible. The larger work is done under the steam hammer in the forging department, and drop forgings are made when parts are required in quantities. Pipe fitting is also done in this shop, and includes the cutting and threading of pipe by hand and with machinery, and the making of nipples and the running of line piping.

To insure the advancement of the student, and to regulate the time he may be detained upon any class of work, a card is issued to the instructor in each shop, which contains the student's name and the particular course he will take, which latter is arranged by the superintendent, and is based upon the previous experience of the student. The instructor upon assigning work to the student gives him a card containing the student's name, order number of the job, shop symbol, and the time allowed, including date of issue. The student enters the hours worked each day, date finished, and returns the card upon the completion of the work. The instructor then inspects the job for workmanship and accuracy, and considers the total time taken, records the latter upon the course and time cards, and indicates the quality of the work by the proper mark. The instructor then attaches his signature and forwards the card to the superintendent's office, where the record is transferred to a card which contains, at the end of the course, a complete record of all work done by the student in the two years spent in all the shops in his course.

An acquaintance with shop literature is insisted upon, and a prescribed amount of reading is assigned each month. Notes are made on the reading and work done, and handed in for inspection each month. Written recitations are held monthly, and examinations at the end of the term. Men failing to complete 80 per cent. of the work assigned, are conditioned and compelled to finish 100 per cent., and pass a satisfactory examination. Instructors in all departments, including the superintendent, are all mechanics.

The gas engines for experimental purposes consist of two 3-H.-P. engines, one 10-H.-P. engine, one 30-H.-P. two cylinder vertical engine, one 15-H.-P. engine, and a gas engine to be run by a suction producer is to be installed. These engines are all of different makes, so as to give the student a knowledge on gas engine construction.

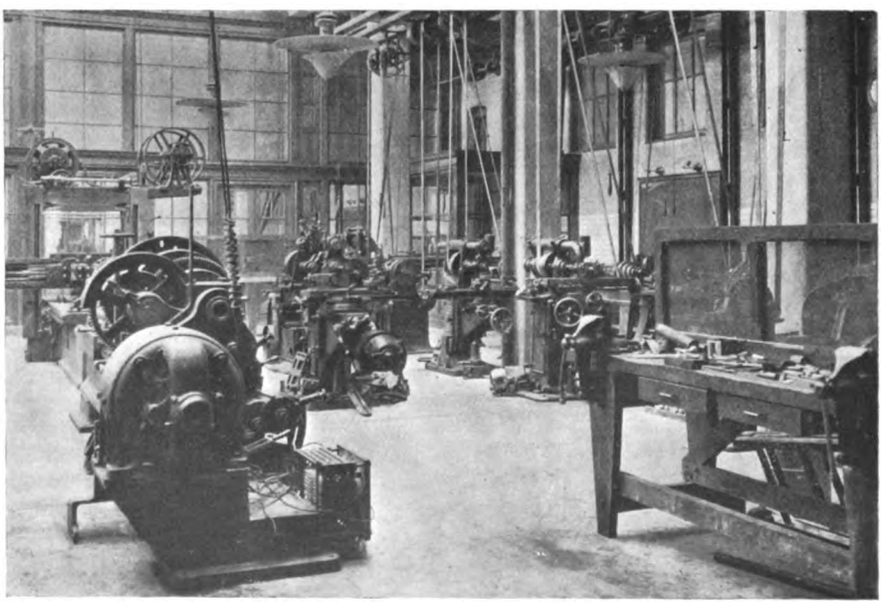
Friction and Lubrication.

R. P. M.

Lubricants are used on machines and in bearings for the purpose of reducing friction. They are of two kinds, oil and grease. Oil is generally used for the lighter grades of work, while grease is employed on heavy work. In selecting a lubricating medium, attention must be paid to the surfaces to be lubricated: whether they are close or loose fitting, their speed and the normal temperature of the bearing surfaces. For close fitting, light running, rubbing surfaces a light weight oil should be used, while for heavy pressures a heavier oil is necessary. In the case of loose, heavy bearings a grease is necessary, as its body confines it to the rubbing surfaces, while a light oil would quickly run out between them.

In selecting a lubricating oil it should be determined beyond doubt that it is entirely free from dirt or grit. For it is very evident that an agent for the prevention of friction must be entirely free from these foreign particles to be successful.

The modern smith with a modern shop equipment will find himself confronted with the lubrication problem, and should of course know something of the principles involved. For his shafting he should use a good grade of grease. This is used in grease cups and is fed to the bearing continually. It is of course apparent that occasional



MACHINES OF THE LATEST APPROVED TYPE ARE FOUND IN THE MACHINE SHOP

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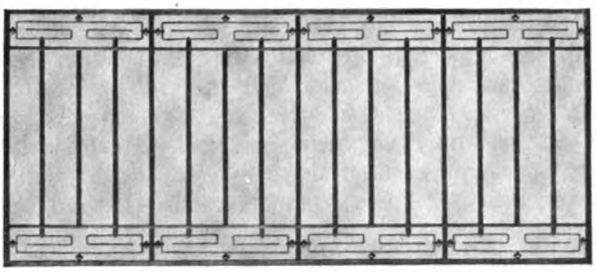
oiling would be most impractical. For the gas engine, the special gas engine oil recommended by the manufacturer should be used. Under no circumstances should steam engine oil be used on a gas engine. The latter presents an entirely different phase of lubrication and should have its own class of lubricant. For the various machines in his equipment the smith must be guided by what has been said regarding light and heavy work.

Mineral oils should always be given preference to animal oils, as the latter are very liable to decompose from the heat and the acids thus developed may attack and finally injure the bearing surfaces of the metal.

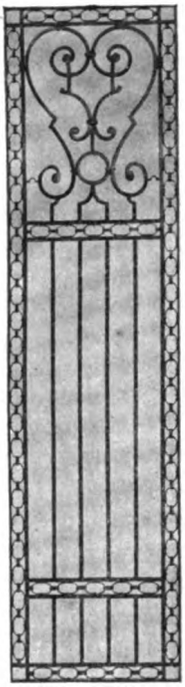
For cleaning bearings and removing accumulated grease or oil, a liberal quantity of coal oil or kerosene will be found valuable. This oil will cut and dissolve any hardened accumulations, and the bearings can be quickly cleaned and brightened. Before closing let me caution the smith with a machine equipment to be careful of his used cotton waste. Don't throw it about the shop, nor allow it to lie in a pile for any length of time. Remember that the greasy stuff is highly inflammable and will burst into flame without the aid of a match.

Two Wrought Iron Gratings.

The manipulation of wrought iron in producing ornamental work consists not alone of forging, welding and the usual smithing operations, but may include embossing, impressing, engraving, etching, inlaying, enameling, planing, grinding and polishing. Embossing consists of heating the piece to be embossed and bossing or bumping it on a piece of wood by hammering it, the wood charring as the metal is expanded and hammered downward into it. Impressing is a similar operation. Engraving consists of cutting designs upon the iron. This cutting is done by means of a graver or graving-tool and with either hand pressure or with the aid of a hammer. Etching is the cutting of designs by means of acids. The operation is performed as follows: The surface to be etched is first covered with a protective layer of wax or other material immune to the action of the acid. The design to be left by the acid is then cut into the wax, laying bare the surface of the metal to be etched, and the acid or etching fluid is then applied. When sufficiently etched the acid is removed from the surface of the metal by means of turpentine or ammonia. This stops the action of the acid immediately. Inlaying consists of hammering one metal into the surface of another. It is done by cutting a groove in the surface of one metal and hammering the other metal into this. Enameling needs no explanation, except to say that most any color effect can be obtained by this means. Planing, grinding and polishing operations are very similar, and the smith is more or less familiar with them all. It is understood of course that the above operations do not figure conspicuously in the larger pieces of ornamental work, but are used only on the finer pieces. The ornamentation of fire sets, lamp standards, candle sticks and the many other articles of household use could be done most advantageously by means of one or a combination of more of the above explained operations.

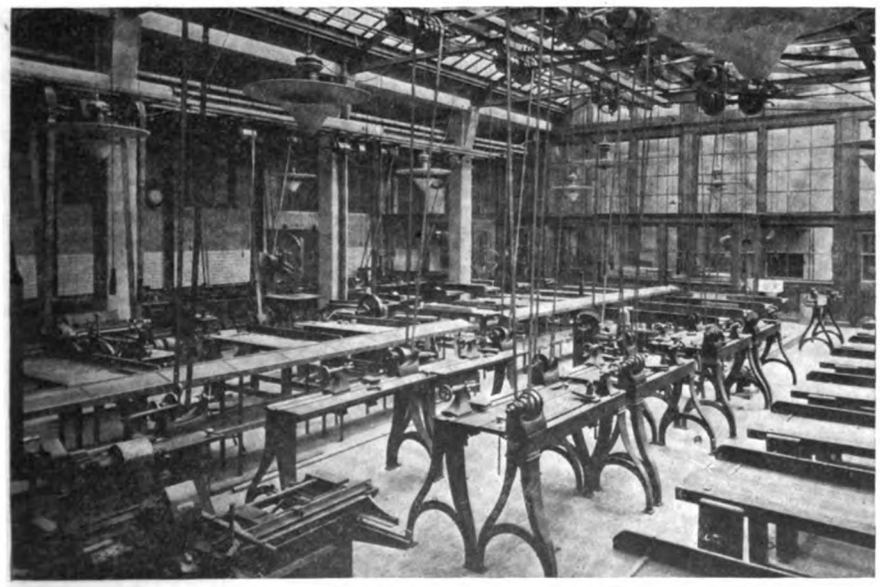


MADE UP ENTIRELY OF STRAIGHT BARS—NO SCROLLS OR CURVES



A VERY PLEASING EFFECT IN OVALS AND BARS

For instance, it would be distinctly out of keeping with the general plan to enamel or engrave the gratings shown in the accompanying engravings. The effect in both of these examples is toward simplicity, and anything of this kind would detract from this effect. The smaller grating is quite odd, in that it contains no curves or scrolls of any kind. The piece is entirely made up of straight bar work, and the general effect is quite pleasing. The larger piece is a very handsome example of forged work, and shows a very artistic combination of ovals and straight bars. The design in the panel at the top is pleasing and tends to relieve what would otherwise have a stiff effect. Both these examples of ornamental iron work were executed at the works of J. E. Bolles, Detroit, Michigan.



THE WOOD SHOP WAS NOT NEGLECTED IN THE SELECTION OF MODERN EQUIPMENT

A Simple Cupola for Melting Iron.

R. H. SOMERS.

A simple cupola for melting iron may be a very elaborate contrivance or it may be made simply of a clay lined sheet iron cylinder. We will take up

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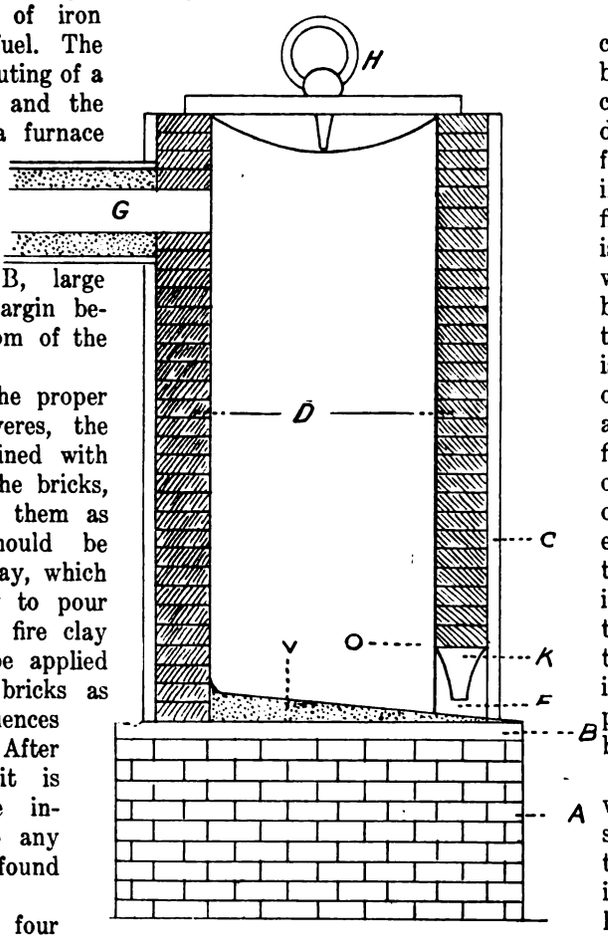
the making of a simple cupola with such directions and explanations as will leave the reader free to construct one for use in his own shop.

The furnace described in September, while originally for the melting of brass, may be arranged with slight changes for the melting of iron while in contact with the fuel. The only difference is the substituting of a sand bottom for the grate and the addition of tuyeres. Such a furnace is shown in the engraving and is made as follows: The foundation A of brick or stone is topped with a circular or square plate, B, large enough to leave a good margin between its edge and the bottom of the sheet iron cylinder.

This cylinder C, after the proper holes are cut for the tuyeres, the tap hole and the flue is lined with fire brick D. In laying the bricks, care must be taken to get them as close as possible. They should be laid in a good quality fire clay, which is used in such consistency to pour readily from a dipper. The fire clay used as a binder should be applied freely, so as to protect the bricks as much as possible from the influences of the flame and hot gases. After the lining has been built it is worth while to go over the inside carefully and patch up any crevices and all the bricks found unprotected from the heat.

The tap hole at F should be four inches high by three inches wide and dome shaped. The holes E for the reception of the blast pipes should be 1½ inches in diameter and located four inches above the bottom on opposite sides of the cylinder. The flue G should have a diameter equal to about ⅓ that of the cupola and should be protected as much as possible from the oxidizing influences of the cupola gases. This protection may be affected by lining the pipe, which may be of any suitable material, with fire clay. The cover H is made to fit the top of the cupola to keep the gases from coming into the shop. This cover should also be lined with fire clay or other protective material. These dimensions are for a small cupola from 2½ feet to 3 feet in diameter with a height of from 3 to 4 feet. The foundation should be just high enough to allow the crucible to be placed beneath the spout without difficulty.

The furnace is now practically ready for operating except that it is best to dry out the lining thoroughly before the first heat. This will take the moisture out of the brick and clay lining and will do much towards the lengthening of the life of the lining. Before starting the fire to



A CUPOLA CAN BE EASILY BUILT IN THE AVERAGE SMITH SHOP

dry the lining, cover the bottom of the cupola with sand to a depth of about three inches, This is packed lightly and a fire at first of fine kindling and finally of coal or coke is started. The fire should be of considerable depth, and after thoroughly igniting should be left to burn itself out by closing the tap hole and the tuyeres. The ashes and cinders may then be withdrawn by way of the tap hole and the cupola prepared for the first heat or charge. The bottom is then again prepared with sand, but in this instance more care must be exercised in the preparation. The bottom should slope slightly, as shown at L in the engraving, and in packing the sand care must be taken so as not to get the sand too hard nor too loose. The protection of the tap hole with fire clay, as shown at K, must also be carefully made so as to insure the safety of the operator when tapping. The tap hole is best made small, as it is then less difficult to stop the flow of hot metal. The tool for tapping is simply a long iron bar pointed at one end and with a handle at the other end similar to the iron used by a stoker or fireman.

In building the fire for the first charge, shavings or other light combustible material are thrown into the cupola from the top, upon this light dry kindling and finally heavier wood followed by coal or coke. The shavings are now ignited, and when the fire is burning brightly more fuel is added until the coal or coke is going well. The charge of iron may now be added, but do not make the mistake of adding this before the fuel is thoroughly afire. It is understood of course that the charge of metal and fuel are alternated after the fire is well under way. The ratio of fuel and metal used should be one of fuel to seven of metal. The operator of a small cupola built upon the foregoing plans will hardly find it necessary to use a flue as used in the operation of a large furnace. After the entire charge has been placed in the furnace the cover may be replaced, the tap hole closed, and the blast started.

The next installment of this article will go into the details of tapping, stopping, and such other practice in the operation of a cupola as to make it safe for the operator and crown his efforts with success.

The Other Side of the Side-Line Question.

ROBERT SUTHERLAND.

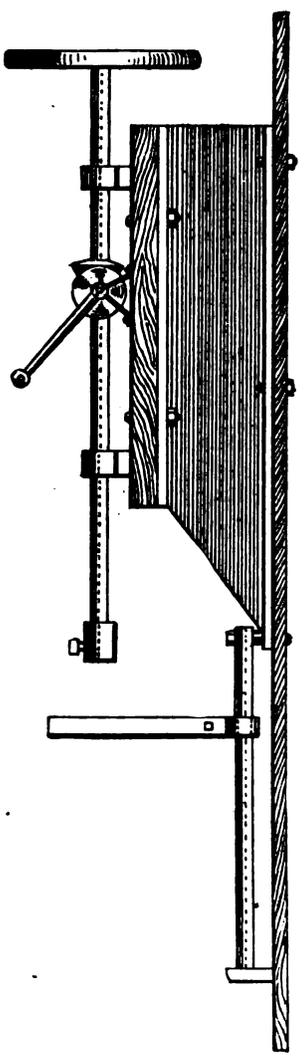
I have read several valuable letters in your paper on "side lines," but having always considered the question from a different point of view, and concluded a little light on the other side would be of interest to your readers. I have regarded side lines as parasites that sap the life out of a business, as barnacles that retard its progress, and have lost no opportunity to lop and cut them off, and, as far as possible, specialize my business.

When a man hangs out the sign, "Horseshoeing and Repairing," he has generally enough to attend. He will be called on to repair vehicles of all kinds from a trotting sulky up to a heavy truck wagon. Farm implements, farm machinery, lumbermen's equipments, masons' tools, miners' tools, and an endless variety of other work, for which he will require a large

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stock, including bar iron, round, square and flat, machine steel, spring steel, crucible steel, springs, spokes, hubs, rims, clips, bolts, screws, and an endless variety of tools. After he has his stock and tools installed, he will find he has no capital left to invest in a side line. And as soon as the public discovers that he is equipped to do smith work in the proper way, he will find he had no time to spend on a side line, and he will soon have a business requiring all his attention, leaving him no spare energy to waste on a side line. And at the end of the year, when he balances his books, he will find he does not need a side line.

Two years ago a man drove up to my shop, with a long pole under the rear axle of his buggy, and one of the wheels tied on behind. He asked me if I could fix his axle? I said, "Yes." I made it a point to attend to cases of emergency at once. While I was welding on a stub, he told me that he drove sixteen miles with that pole. He said the first shop he came to, the owner was grinding feed with a little gasoline engine, and had no axle ends. The owner of the next shop was away from home doctoring a sick horse, and the boys he left in charge would not undertake the job; and at a third shop, he found the boss down in the cellar making cider. He told me that he had bought a lumber lot in the mountains, and was about to set up a saw mill on it, and arranged with me to have his mill repaired, and do all the other smith work required in his lumber business. And during the succeeding year I derived more profit from work done for that one customer than my three friends derived from their side lines. If I was going to grind feed, I would buy a grist mill and go into the feed business. If I was going to saw wood, I would buy a saw mill and go into the lumber business, but if I was going to run a smith shop, I would go into it with every cent of capital and every ounce of energy at my disposal, and run a smithing business and nothing else.



A DRILL EASILY MADE

Ten years' experience with power in the shop has taught me that the introduction of power rendered it necessary to narrow down the range of work, and specialize as far as possible.

A Home-Made Post Drill.

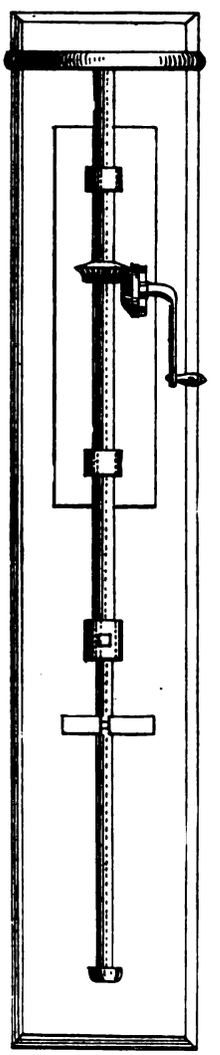
A. S. PRIMMER.

The accompanying engraving shows how I arranged a bench drill to work as a post drill. First, I secured a two-inch plank, eight inches wide and five and one-half feet long. I then took a piece of seven-eighths-inch stock, four inches wide and long enough to bend as shown in the engraving and to allow sufficient surface to attach the bench feed screw. Now get a bevel gear-wheel from a binding machine; secure the shaft and all. Then get a fly wheel that is not too heavy, and secure it to the drill shaft. When these have been fastened in proper position on the plank, take a piece of round iron, one and one-half by twenty-two inches long, and fasten it securely to the plank just below the piece of iron supporting the drill and feed. This piece is to support the table. To make the clamp for holding the table, take a piece of good tire, two and one-half by five-eights of an inch, and long enough to support the work properly. This fork or clamp can be raised or lowered on the post by loosening the bolt and nut which holds the fork in place. The cost of my home-made post drill, including everything, was about $5.00.

A Talk on the Cold-Tire Setter.

W. S. SMITH.

I have seen several articles in "Our Journal" on cold tire-setting, and I am somewhat surprised to see so many smiths condemning cold setting. The cold tire-setter is here to stay. I have used a cold tire-setter for two seasons, and have found it a grand success. It is the greatest labor-saver and money-maker I ever saw. No up-to-date smith can afford to be without this machine. You have a hard task when you set the old way; you must take off the tire, cut it and weld it, or shrink in a hot shrinker and measure both wheel and tire. Then you build a great, hot fire on your tires and sweat over it, and then when your tire is hot you run up and grab it with your tongs, drag it out, shrinking from the intense heat. After the tire is on the wheel you must have a lot of water ready to cool it. You pour on water until the tire is set enough to stick, then lift your wheel from the trestle and spin it around in water. The smoke and steam that fills your eyes and lungs makes you cough and wipe sweat, and gasp for breath, and then at last, when you are almost exhausted, your job is done, and may be you have the right dish in your wheels, and perhaps not. With the cold tire-setter you have only to take off your wheel, set it in your machine, give the lever a few pulls, and the work is done. You have the desired dish in your wheel, it is nice and dry, and there are no burnt or bruised felloes. Your money is made quickly and easily, your customer is well pleased, and you are ready for doing work for your next customer.



AND AT SMALL COST

Some one asks what will you do when a spoke or felloe is broken in the wheel? Mark your wheel and tire, knock off the tire, repair the wheel, lay your wheel on the trestles, and slip tire on exactly as it was (which is easily done), and put wheel in machine and shrink. If you are going to condemn the cold tire-setter, how are you going to improve,

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or don't you believe in improvements? Are you going to use the same old tools your grandfather used, and do your work in the same old way, or are you going to be up with the times? The only question is this: What make of cold tire-setter is the best? My opinion is that any of them will do the work, and after trying one you wouldn't be without it. If I had to give up my machine and go back to the old way of setting tires, I would quit the business.

THE HORSESHOER

High heels will cause corns. It's the treading too much on the heels that causes concussion, which results in bruises and intense fever. Keep the heels down. Quarter crack may also result from raising the heels too far from the ground. T. S. M.

Horses travel better, last longer and stay sound if shod often. If the foot is allowed to grow long, the wall gets too high and is then not capable of as much resistance under weight as when it is even with the margin of the sole. See that the animal stands squarely over his feet when you view him from in front or behind. Keep the feet level by trimming often. S. B.

Don't rasp the hoof wall any more than is absolutely necessary. The hoof is covered with a varnish-like film which protects the hoof and keeps it from becoming dry and contracted. When this protective covering is removed by rasping or other means, the horn tubes are opened and the foot becomes contracted and diseased. Should the protective covering be removed from the hoof the wall may be painted with pine tar or other substance though it is far better to preserve the natural protective film intact. If rasping is necessary let it be little as possible. H.T.HARUS.

Shoeing Crooked Feet.

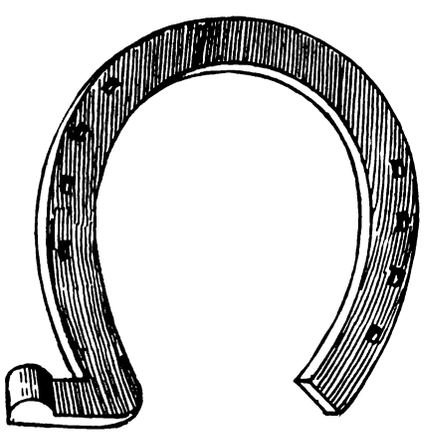
JNO. J. CAMPBELL.
(Prize Contest.)

As there is not much said in THE AMERICAN BLACKSMITH about crooked feet, I will write a short article on how to straighten a "run-over" foot that has been neglected. I had one that was turned in so bad that the fetlock joint almost touched the ground on the inside. I have also had several others, but not so bad, which I cured with success, as follows: Take a right hind foot, for example, that is bad. First clean out the foot, take the loose scales out, if any, and pare the foot level, as in its present shape, so you can put a shoe on it. Then take one-fourth of an inch from the outside clean to the toe. Now level it down for the shoe. Turn the inside of the wall of the foot as close as you can on the outside, but do not trim the frog or the inner side of the wall on the inside of the foot. Now, take a plate shoe large enough so as to turn a roll calk on it one and one-fourth inches long and leave it is high as possible. Then turn it out at right angles with the shoe, the spur being the full length of the roll calk. Clip the other or outside heel off even with the wall of the foot and turn it in close. Raise the inside of the shoe the same as the roll calk, so as to crowd the wall of the foot out as it grows. Now set the shoe so as to trim a little from the outside toe, and let it extend on the other. Change the shoe as often as the foot can be trimmed down, leaving the inside as long as possible.

The Art of Horseshoeing.

E. W. REIBER.

In years gone by our forefathers thought it only necessary to be capable of nailing a shoe to the foot. But in this day and age 'tis otherwise. In order to be a capable horse-shoer and stand in the higher ranks the farrier must possess a thorough and complete knowledge of the internal structures of the horse's foot. He should be familiar with each part and all parts, which, in a whole, constitute the foot, the functions they are desired to perform, how they may become injured, and he should be capable of prescribing a remedy for any ailment that might lie within those walls—the walls of the foot. When we stop to consider the vital importance of this subject and look backward only a few, short years, we find a great change and a ray of light is taking the place formerly held



A SPECIAL SHOE FOR CROOKED FEET

by the dark cloud which hovered over the heads of our father horse-shoers. And I sincerely trust we may see the day when the profession will be looked upon as one of great honor. Someone will ask how this can be accomplished, it is simple enough. Each member of the craft already in the line of march should put forth every effort, study the foot from the knee down ,and study as though you expected to meet your examiner within the next thirty days. When this is accomplished by the greater majority of the horse-shoers, we will ask congress to enact a law providing all persons wishing to embark in the profession be compelled to successfully pass a rigid examination. If successful they will be given a diploma and allowed to practice the art of horse-shoeing. When this is done, a man may feel perfectly safe in submitting his most valuable animal to the care and wisdom of any horse-shoer he finds doing business. It is painful to see a man, who calls himself a horse-shoer, cutting and butchering a foot. He is simply working in ignorance, and the general result of ignorance is failure. Nothing serious may appear in the first, second or even the third shoeing, but by and by the horse goes lame and the cause is a lack of knowledge pertaining to the art of horse-shoeing. I earnestly believe that nine-tenths of the ailments of the foot may be ascribed either directly or indirectly to improper shoeing.

This reminds me of a conversation I had with a horse-shoer whom I met a few years ago. This man asked: "Mr. Reiber, do you know what kind of a man it takes to make a good horse-shoer?" I told him that I didn't think I did as I had never given it a thought. "Well," he says, "I'll tell you, it takes a man with a weak mind and a d— strong back to make a good horse-shoer." I very heartily agreed with him on the latter point, but quite disagreed on the former. But that is just the view of a great many people to-day. They are under the impression that the man who can nail on the most shoes in one day, or week, is the best horse-shoer, but they are wrong.

I will conclude by answering the question, "How to shoe a forger?" Mr. Owens gave me some very good points on shoeing the forger with plates, but it is oftener they wish to use a toe-calk or grab than the smooth shoe. I have found the following method a success. In shoeing the forger, always remember the points to be gained—quicken and shorten the stride of the fore foot and do the opposite with the back foot. To quicken the step in front, pare the foot low on the toe, allowing the heels or quarters to remain high. In case the quarters are low, build them up with

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leather both to an even height. In fitting the shoe, make it plenty long enough and place the toe piece far back on the shoe. In extreme cases it is necessary to place the toe as far back as between the first and second nail hole, the toe passing clear across the shoe. Then roll the toe of the shoe. To shoe the hind feet, allow all the toe possible to remain—because the longer the toe the better your chances. Cut the heel low, then place a very ordinary shoe on with a spur on the outside and a toe piece well forward.

A Talk on Shoeing Vicious Horses.

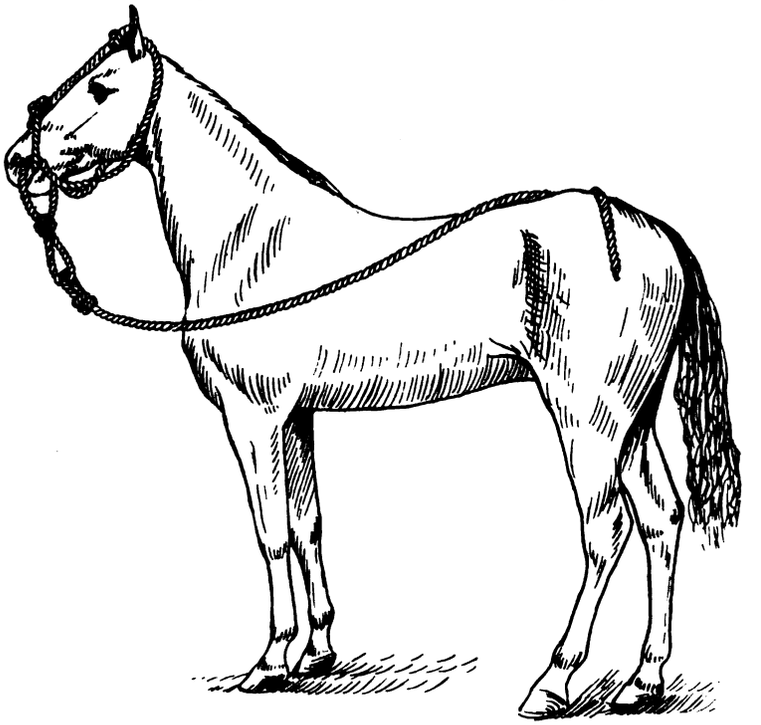
C. W. METCALF.
(Prize Contest).

I found a little device which cost but fifteen cents, and as it is a perfect success, I will give it to the craft. In the first place, I take about ten feet of one-fourth-inch rope and place both ends together to find the middle. Now tie a knot, just big enough so the rope will pass into the horse's mouth, and the knot come on top of his nose. Now tie another at the foretop, just between his ears, and then bring the ropes on each side of his head, cross them under his jaw, and bring the same end back to you again. Now run the ends up through the loop which is in his mouth, and then tie a loose knot under his chin. Now tie a piece of larger rope on to this, so you can stand behind the horse and still have plenty of rope. You are now ready to go to work. Take the rope in one hand, and with the other take hold of the foot that you want to operate on. If he wishes to take the foot, don't try to hold it, but with both hands take hold of the rope and throw your whole weight on it three or four times. If he shows fight, double the dose. It seems to draw on the "nerve" that I call the "nerve of sense," and in from one to five minutes, you can put more sense into a horse than five men can pound out in an hour. A child that is big enough to hold the weight of the foot can then shoe him without any bother. You need not be afraid to use it; you can't hurt a horse with it. If a horse has a sore mouth caused by the bridle, you can't tear the scabs off, and you don't have to tie him up to make him stand for shoeing.

A Plain Talk on Shoeing.

W. M. RIGGENS.
(Prize Contest.)

There has been a great deal said in regard to forging and interfering. I have shod horses for over forty-five years. I own horses, drive and work them, and know by experience that shoeing is a trade by itself, and I can stop any horse from interfering in two shoeings. The only secret is that the hoof must be dressed correctly. Never put on a shoe and trim the heels. I leave my shoe straight at the heel, and trim the outside of the hoof, say one-fourth of an inch lower than the inside. See that the foot is straight, as a horse that knocks never hits with the shoe. It is the hoof that strikes the side. Weights on the shoes require the horse to learn to go with such a shoe. This is a fact. Side weight your own foot and you will see that you can hardly go. As to forging, my way of shoeing a forger is to set the toe calk about a half inch back on the front shoes, making the toes as round as I can, and making the heels one-half inch higher than the toe. I use a heavy shoe; no plates will work. To fit a light shoe for the hind foot, place the toe same as the front, making the heel and toe about the same height. Try this way of shoeing once and you will be convinced.



THIS ARRANGEMENT WILL NOT INJURE THE HORSE BUT WILL "TAME" THE VICIOUS ANIMAL QUICKLY

Shoeing With or Without Calks.

FRANZ WENKE.

Very often, and in the majority of cases, blacksmiths shoe a mule rough, where they would shoe a horse smooth—that is, without clalks. In horses we shoe the feet smooth in order to get frog pressure—why not the mule? The theory is advanced that mules cannot pull with a smooth shoe. But why can a horse? In January, 1903, I commenced shoeing mules for the Government, at Fort Wingate. Previous to this, all the mules had been shod rough, and out of 69 mules I had 40 more or less contracted. I immediately commenced shoeing smooth, so as to get frog pressure. Everybody, of course, hollered, "The mules are slipping and can't pull." Anybody who knows the ground around Fort Wingate, knows that there are awful hills to climb, and that the ground is clay. But no slipping or stumbling of teams occurred, because a mule, no more than a horse, does not pull with his toe calk alone, but plants the whole foot on the ground when he pulls. I shod the mules in Wingate for three years, and, with the exception of a few short weeks in winter, when we had snow and ice on the ground, I shod them no other way but smooth. When I left there last winter I had 85 mules but had not a single one with contracted feet. All of them had nice feet and frogs, well spread out at the heels. Some smith will say "But the shoes do not last as long as with calks." Yes they do. When a horse or mule travels the first two weeks on his new shoes, he will wear the sharp corner of the shoe off, and make rolling motion for himself. But, now watch the horse or mule from the second to the sixth or seventh week, and you will find that he does not wear his shoes at

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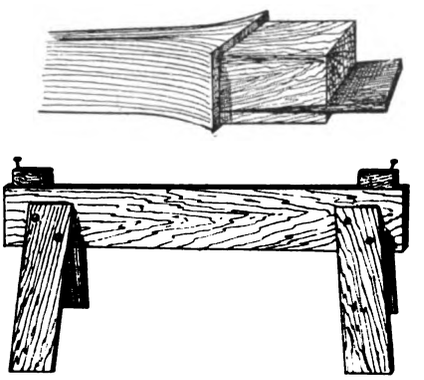
the toe perceptibly. This would give eight weeks of constant wear, and that is long enough for any horse or mule to have his shoes on. After the mules have their shoes on for such a time, and even longer, I have reset the shoes, and they have lasted another two months. I have done this, not only in Fort Wingate, but all over the United States. I have shod field artillery horses the same way, and have found them invariably the same. I do not believe that we help the horse or mule pull with our high calks, nor do we contribute to his comfort, but, on the contrary, by shoeing him flat, and giving him frog pressure, we save him from corns and contracted feet and other troubles.

A Good, Practical Talk on Buggy Work.

J. F. BOYD.

I like to read the talks on Sarven wheels. In my opinion the wheel question can never be settled in print. It takes time and practice, just as it does to make a good surgeon. No two wheels will stand the same treatment. To be a success you must know the defects of each wheel you place upon the stand. The opening in rims must be determined by the conditions of each wheel, the size of spoke, etc. In filling an old hub, I drive them in pairs and put in my rivets. Then on each spoke driven, mark around flange of hub with pencil. You will then know if a spoke backs out as you drive your last spoke. If you find your spokes back out ⅛-inch or so, you can let that spoke be that much longer, and the tire will force it back in hub, making a good tight job when done. Only place four rivets until the tire is on and spokes have settled. In putting on new rims, let your spokes be 1/16-inch lower than rim. That will allow rim to settle down, and make a nice joint. Figure on dishing your new rim wheels 5/16-inch more than they should be. When your last tire is on, the first is cold. You can then place on wheel rack and screw down flat, with no dish. Settle each spoke lightly with hammer, remove, and you will find you have a good wheel.

In the October number Brother Hellerstedt gives his method of fixing back-dished wheels, and says if that doesn't work, get another wheel. Take a spoke out of a back-dished wheel, and you will see that the front of the spoke tenon is mashed back one-eighth of an inch. If you dish your wheel, that opening still remains at the end of your spoke, and any twist on the wheel will throw it back again. My method is to take out all the spokes, pound up your top flange about 1/16 of an inch all around, take your knife, split your spoke tenon back ⅛-inch from front of spoke, make a blind wedge ½-inch long by ⅛-inch thick, start in split, then drive your spoke in. The wedge will stop when the box is hit, and will be forced into the spoke filling the space. Put on your rim, set your tire, and I will guarantee a good job. A man would rather pay you extra than buy a new wheel. Should a wheel need eight new spokes on one side, it will pay you to divide your spokes. Take out part of the remaining spokes and place two new



HINTS AND KINKS TO HELP THE CARRIAGE REPAIR MAN

and two old all around your wheel. My reasons are: Should the new ones be placed all on one side, and the weakest spokes have the most dish, it would cause your wheel to wabble. Look over your wheels carefully for bent spokes, show them to the owner, and take them out either on a reset job or new tire. You can't dish a wheel and give satisfaction where there is a bent spoke, as the spoke will bend more and you will lose your dish. I make the horses on which to place a buggy (while taking off wheels) about two feet long. At each end, nail a block two inches high, and at one end of each block start a 10-penny nail. Now place your horse in front of the front axle, with the two blocks under the axle. The nails will keep it from falling. Now pull up on your shafts, and your buggy will come up on the horse, while the blocks will keep a drop axle or fifth wheel from bothering.

To raise a buggy bed while putting in a spring, body hanger, or spring bar, take strips one by two inches and four feet long, and nail a short piece a foot long between them at one end. Now bore holes in these pieces like in a quilting frame. Make a lever that will slide between them, place one on each side of the bed, and with your lever you can walk your bed up any distance required. When a buggy bed comes to you broken loose, and dropped down at the corner, raise the corner to where it belongs, and then take an old machine section and drive, point first, between sill and body hanger flush with the side. Now screw into sills through holes in the section, finish your side in the usual way, and the job will never come back.

To move buggies, that have no shafts or pole, about the shop or yard, I straighten an old buggy tire and bend it together in the middle. Then take a half twist in each end and bend as a hook and the job is done. It is no trouble to spring it apart to fit shackles. I also made a pole with which to lay off shafts. I know every smith should have one. This pole is one by one inch and eight feet long. At three feet eight inches from end, drive a brass headed tack, 21½ inches farther up the pole drive another, and six inches farther on, another. The first tack is middle to middle of eye, also from cross stick to where hold-back straps should be nailed. At the second tack place your pole against the cross-stick and mark each shaft and cross line. The third tack should come on your shaft mark to have your shafts marked true. No guessing, no extra measuring. It is there before you, and you still have pole enough when irons are on to test your shaft eyes. Should you be in need of timber to make a buggy perch or reach, you will find that a fork handle will make a good one. Your old shafts will make your axle-beds and singletrees, also side bars for buggy.

If your brothers who live in a level country would come down here among the hills and rocks, you would wonder how a buggy could get along without breaking. It takes a good set of black hickory rims 1 by 1¼ to wear out two sets of tires. I have put on 37 sets of new tires this year so far, and more to come. Isn't that pretty good for a branch road town of 800 population?

A Practical Kink for the Wheelwright.

R. MARSHALL WHITE.
(Prize Contest).

I have discovered a kink in the craft giving me so much satisfaction that I

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want my brother smiths to learn it. I believe it is new, for I never heard anyone speak about it, nor have I seen it in any publication or journal. Purchase (if you have not one already) a universal chuck to fit your drill press. Make the shank on the hollow auger or tenon bit round, and place it in the chuck. You can then cut the tenons, or spokes, with more ease than you can drill the tire. The way I have my drill is this: I have a board, two and one-half by ten inches, made fast to the floor and ceiling, with a mortise near the top, and a pulley for cord over it from drill to keg; on the other side fill with scrap, to counter-balance weight of drill, and clamp with nuts so as to adjust the drill to the right height for any wheel, and a center mark on floor makes the tenons in the right direction. A trial, if you have never thought of the trick, will cause you to thank THE AMERICAN BLACKSMITH for bringing the news to you.

Credits that Kill.

G. W. TINKEY.
(Prize Contest.)

No man ever did business on a loose credit policy and survived. Free credit will kill a business in time. Credit is like the trickling stream that undermines the dam, until with a rush the waters go through, carrying destruction with them. The blacksmith who has been loose in his credits, not only loses himself, but others lose with him, as the innocent suffer with the guilty. Credit methods have changed in late years all along business lines. The jobber has drawn tighter rein, not to benefit himself only, but for the good of the trade. The jobber steps in and becomes, in an important degree, a balance for a large number of those who are honest, but who lack in ability to buy within proper limits. The smith has come to appreciate this and generally likes it. He finds he is making more money than he did under the free policy of doing work and selling his products without regard for the ability of the buyer to pay. Business is conducted to make money, and money cannot be made by selling to or working for a "dead beat." Of course there are those who are perfectly honest, but have not the ability to pay, although they think they have. Men lack courage when it comes to talking credit. There are those so clever that they can obtain credit, in face of the fact that they have not paid previous bills and owe at that moment. It takes an extra good man to stand against all that is before him and come out ahead. Having tried the cash business for eighteen months, I have more friends, less trouble, and just as much money. One does not have to do as much work, or turn away an honest man, as when working for the "dead beat." It's a pleasure to work for money, but not very pleasant or encouraging to work for nothing.

How to Put Brass Cogs in a Wheel.

JOHN F. KOENIG.
(Prize Contest.)

First, cut and dovetail where the cog broke, about one-eighth or one-fourth inch deep, according to the thickness of rim of wheel; then bore two holes in the cut and cut threads in them; cut threads on rod and screw in tight. Then cut the rod off about one-fourth inch shorter than the height of cog. The rod must be so that the brass covers it. Now take two plates the height and width of the cog and shape the same as the other cog. Then set the plates on the edge of the cut to get the right thickness of cog. Now take two more plates, place them on the sides and clamp all together with clamp screws. Now fill the space between the plates and other cogs with clay to keep them in place. Then take a plumbage crucible and put in your old brass and melt it to a very bright heat, so that it flows very freely. Now pour in quickly and, after it cools, take away the plates and dress down edges with a file, and you will be delighted how nice a cog you have. I charge from $1.50 to $5.00 per cog, according to the size.

AROUND OUR FORGE FIRE

Benton and the Editor were intensely interested in the subject of future issues when Whiting came in with what appeared to be a new file, but which he said was an old one which he had recut. Upon being asked regarding his method, he said:

"Well, I thought you'd like to know about it, so I brought over a sample to show you, and if you think anybody would be interested in the formula, why you can have that, too."

"Of course, we want the formula," replied the Editor. "We want to know all about your method."

"Yes," said Benton, getting out his receipt book and showing much interest, "let us have the receipt you used."

"Well, you first clean your files by brushing them with a wire brush. Then you remove all the grease and dirt from them, by washing them in a strong solution of sal soda. After this, brush them again and place them in an earthen jar in such a way as to not touch each other. Now, you cover them with a nitric acid solution and allow this to eat for about half an hour. Then remove them and wash in water, and again replace in the acid solution, which has now been made stronger. Let them remain for about an hour this time, and then proceed as before, putting them back in the solution a third time and adding a small quantity of sulphuric acid. After about fifteen minutes the files may be removed, washed in water and then in lime water and then dried."

"How much acid do you use in your solution?" asked the Editor.

"I use about one pint of nitric acid to each gallon of water, and add a pint after the first bite. The amount of sulphuric acid used is about one-half pint to the gallon of solution."

"That should be of some use to your readers," said Benton, "and, why couldn't a chap make a business of recutting old files? There ought to be good money in it. It doesn't seem to me that the ingredients would cost very much."

Morton came in at this point with a copy of the November paper. "Can I get an extra copy of that horse on the second page?" he asked, addressing the Editor. "I don't want to tear it out of this paper and I want a copy for framing and hanging in the shop."

"Certainly you can get a copy," was the reply. "I expected just such requests and put in a supply of those prints with plain backs; and I had none too many, either. Just got one or two left for office use, but I guess you can have one."

"Seems to me," said Norton, "that a collection of those frontispieces ought to make pretty good decorations for the smithy office."

"Quite a number of readers have made known their intention to use them for decorating their offices, and we have, of course, had to have special prints made."

"Is the January issue going to be a special?" asked Whiting, looking over the rough layout for that number.

"No," replied the Editor, "not special in the way you mean. It's going to be a special in size of edition only. There will be just twice the regular number sent out, but that is all."

"Well, it looks very much to me like a special. If that's the way it's going to look, it will be the best issue you've ever gotten out. I can't understand how you can possibly improve any more on 'Our Journal.' Seems to me that you're just about bursting the cover now."

"Well, we intend to improve continually," said the Editor, smiling. "Our Folks must have the best that can possibly be produced, and that is what we are producing right along."

The boy entered at this juncture with a big pile of photographs, marked "Jan., '07," and the little chat was promptly, brought to a close.

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To My Horse.

ANONYMOUS.

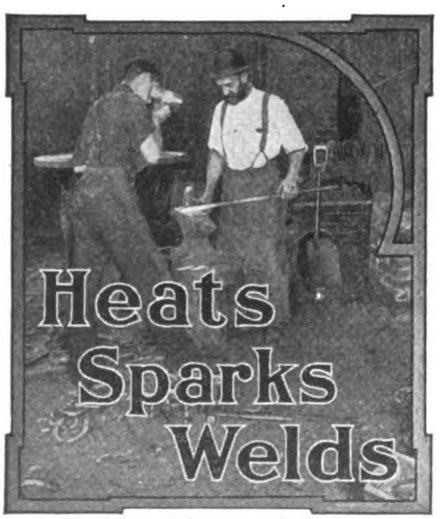
With a glancing eye and a curving mane,
He neighs and champs on the bridle-rein,
One spring, and his saddled back I press,
And ours is a common happiness!
'Tis the rapture of motion! a hurrying cloud
When the loosen'd winds are breathing loud:
A shaft from the painted Indian's bow,
A bird—in the pride of speed we go.

There is life in the breeze as we hasten on;
With each bound some care of earth has gone,
And the languid pulse begins to play,
And the night of my soul is turned to day;
A richer verdure the earth o'erspreads,
Sparkles the streamlet more bright in the meads;
And its voice to the flowers that bend above
Is soft as the whisper of early love.
With fragrance spring flowers have burden'd the air,
And the blue-bird and robin are twittering clear.

So the vex'd breast of the mountain-lake,
When wind and rain and revelry make,
Turbid and gloomy, and wildly tost,
Retain no trace of the beauty lost.
But when through the moist air, bright and warm,
The sun looks down with his golden charm,
And clouds have fled, and the wind is lull,
Oh! then the changed lake, how beautiful!

The glistening trees, in their shady ranks,
And the ewe with its lamb along the banks.
And the kingfisher perch'd on the wither'd bough,
And the pure, blue heaven all pictured below!
Bound proudly, my steed, nor bound proudly in vain,
Since thy master is now himself again.

And thine be the praise when the leech's power
Is idle, to conquer the darken'd hour.
By the might of the sounding hoof to win,
Beauty without and joy within;
Beauty else to mine eyes unseen,
And joy that then had a stranger been.



'Tis never necessary to watch good help.

Ever hear of the devil using a man who loved his enemies?

Cheerfulness and perseverance come pretty near to securing success.

What's your idea on the tire setting question? Set them hot or cold.

Hubbard says: "If you work for a man, in heaven's name work for him."

Who would succeed must learn to stoop; climbers must bend to their task.

A stadium of reinforced concrete, with a seating capacity of 40,000, is being built at Yale University.

Of course you will celebrate Christmas Day with the "home folks," and a right merry time we wish you.

"When a customer asks for something I haven't got, I tactfully insist upon getting it for him," said Thornton.

How's business in your parts? A generous use of advertising oil will make the bearings of business run easier.

A good practical horseshoer will find an opportunity awaiting him by writing Tony Dreesback, Morenci, Ariz.

True friends and fortune go hand in hand through the business world. Stand by your friends and increase the list.

Cold weather doesn't chill the business pushing ability of the progressive smith; it but warms him up to stronger efforts.

"A good, general smith or two" can secure a good position by communicating with Mr. J. M. Fix, of Fairfield, California.

The Vatican, the home of the Pope at Rome, is valued at $150,000,000. This includes the vast treasures stored in the palace.

The safe load in tons for chains may be found by squaring the diameter of the iron in the link in eights and dividing by nine.

Another year has rolled by and we are at the next mile stone. Have you remembered your resolutions? Try to keep next year's leaf turned.

Someone says that a stick of soft porous wood placed in a water tank will prevent the formation of ice over the entire surface of the water. Try it?

'Tis best to send it loose when enclosing a stamp for reply, but if you must attach it to your letter, moisten the center of the stamp slightly and not the corner.

Keeping persistently at it, whether advertising, working or pleasuring, is the only way to obtain the results you seek. Do what you do for all your are worth.

Tis not always use that wears out the tools and equipment. Lack of care sometimes does it quicker than actual service It pays to look after things properly.

Get after them now, when they have money. The past season has been a most prosperous one for the farmer, and to pursue your collections now will mea results.

Wish your neighbor a hearty "Merry Christmas," and then back up your greeting by presenting him with a copy of "Our Journal" and an invitation to become one of "Our Folks."

Put yourself in your neighbor's place when you think of cutting prices. It takes a big man to see all sides of anything, but it will show you that you are doing wrong. 'Twill hurt both of you.

You've been pretty busy, of course, but you can certainly slick up a bit now. Brush down the cobwebs, use the broom freely, get things tidy. Glance about the shop now and see what's needed.

'Tis said that the total value of the steel and steel products reached nearly $700,000,000 last year. 207,503 workmen were employed, at a cost of $132,491,995. Truly the steel industry has reached great proportions.

The smallest sheep in the world are the tiny Breton sheep. 'Tis too small to profitably raise for it can have little wool, and for eating, why, a real hungry smith could eat almost a whole sheep at a meal.

According to an exchange, the people of the United States have more than $3,000,000,000 deposited in private savings banks, or an average of $418.89 for each individual. How many smiths are above the average?

Right now is the time to organize—when a few cents' advance in prices will show up big. But get busy—nothing worth while was ever accomplished without some effort. Ask the secretary today for easy plans. A postal will do.

Picture a banquet hall sufficient to hold the mechanics of the world with "Our Folks," the blacksmiths, at the head table, and you will have their right position, as regards the universe of iron industry. Who says otherwise?

The next great western world's fair will be held in Seattle in 1909. It is to be called the Alaska-Yukon-Pacific Exposition, and work has already been begun on the grounds. The object of the exposition is to exploit Alaska and promote Oriental trade.

Notwithstanding the great economy of the gas engine, considerable heat is wasted in the exhaust. At Kilmarnock, Great Britain, raising steam from the exhaust gases has been successfully tried, the gases from several engines being passed through boilers.

Three Christmas presents for a dollar bill: A year's subscription to "Our Journal" for a friend; six months' subscription for yourself; a new subscriber for us. Can you distribute Christmas cheer to better advantage? Better act *now* on this suggestion.

Last Tuesday was a busy day for local smiths. 'Twas the season's first freeze after a heavy rain and most smiths were pounding early and late. This didn't disturb Tom, though. He opened and closed shop as usual; evidently doesn't believe in making hay while the sun shines.

Do the hard things first. Don't put them aside to pick out the easy tasks. If you have several jobs to turn out, dispose of the more difficult ones and the others will not seem nearly so hard. You are better able to cope with the hard tasks when fresh to your work than after you have disposed of the lighter work.

An immense steel chimney is that of the Compania Minera de Penoles, at Mapimi, Mexico. It is 300 feet in height and twenty-four feet in diameter at the base. The steel chimney of a mining company at Douglas, Arizona, is 200 feet in height and thirty-four feet at the base, and is the one of largest diameter in the United States.

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American Association of Blacksmiths and Horseshoers.

The past month has seen the formation of several branch associations. Two of these branches have been formed in Canada, which, I think, speaks very highly for our plans. Yet this is not all the encouraging news that has been received within the past month, as there are numerous prospective associations now beginning the work. The following extract from a recent letter will give you a small idea of the success with which our movement is being received: "I have received your plans of forming a county association. I have seen nearly all of the smiths in this location, and have found them *all* willing to organize. We will hold a meeting here as soon as possible, and get right down to business." Every right thinking smith knows that organization is the key to the present low-price situation in the smith field. You will note that the writer of the above letter says that *all* are willing to organize. Why don't you, Mr. Reader, start the ball rolling in your county? Your neighbor smiths are no different than those in any other county, and there is no reason why they should not think as favorable of organization as those referred to in the above letter. Don't hesitate to write me regarding the situation in your county. Even should your prices be all that can be desired, there are still other questions which can only be settled by organization. Suppose you send a request for our easy plans today, by return mail, and I will send you all the necessary information and instructions for forming branch associations. A postal card will do, and you will be agreeably surprised by our offer of liberal assistance. If you realize the needs of organization in your county, and you certainly must, you will write me immediately.

THE SECRETARY.

Personal Interest.

Personal interest should enter into every one of your transactions with customers. Or at least give the customer the impression that you take a personal interest in his purchase, that you insist upon giving him one hundred cents for his dollar. To sell a man a wagon, repair his plow, or shoe his horse, pocket his money and say, "Thank you, come again," is one way of doing business. But when you sell him a wagon and incidentally mention various points about the vehicle—how he can preserve its protective coat, lengthen its life and guard its wear, you are taking a personal interest in his purchase; you are paving the way for other orders. If the customer's horse is in need of special shoes, let the owner know that you are giving him what he needs. If the animal has some disease of which the owner knows nothing, tell him about it and how to remedy it. This little attention will take but a small part of your time and will be returned to you in the shape of increased business. Don't lose any opportunity which may come up for showing your customer that you are always willing to assist him in getting full value in everything he purchases.

Of course, you will come across some customers who may resent your interest, but the smith with a fund of practical suggestions and a tactful manner is certain to secure the good will of his customers, and he will find that his little drops of information, suggestion and personal interest have turned to gold.

The Question of Farm Wagon Warranty.

E. W. M'CULLOUGH.

This question of warranty has been considered by the wagon manufacturers and their organizations for the past quarter century, and the various forms submitted have been subject to frequent revisions, without meeting general approval, until the present effort, which has not only been adopted by the manufacturers, but also has met the official approval of the National Federation of Retail Implement and Vehicle Dealers' Associations, and will be by them recommended to their constituent associations.

The revised form contains protection against imposition, not only for the manufacturer, but the dealer as well; at the same time gives the consumer proper coverage on all actual defects in material and workmanship. The adoption of this official form also removes the question of warranty from competition, these rules for adjustment being the same in California as in Maine.

The meeting of the manufacturers and retail dealers on this common ground, and the successful adjustment of this matter in a mutually satisfactory manner, serves to illustrate the growing desire for the consideration of similar questions that have been, and are now, mutually annoying, and stand in the way of economies that would be of great benefit and pecuniary profit.

It is hoped that at no distant date, the enormous amount of capital now employed solely in the carrying of agricultural implements and vehicles an unwarranted and unnecessary length of time, for a class that stand today among the greatest beneficiaries of general prosperity, will no longer be necessary, and that this practice, which originated in the pioneer days, and which has long become obsolete in all other lines, may be greatly curtailed, if not entirely abolished. From an economic standpoint, the evil of this large amount of inactive capital is commonly admitted by manufacturer and dealer alike, and would seem to require the same mutual treatment illustrated in the case of the warranty.

Repairing the Shop during Spare Time.

H. D. HOVIS.

I have been benefited in many ways by reading the articles written by members of the craft, and others, pertaining to the upbuilding of the blacksmith trade the world over; and when I think of the very small part I have done in that direction, I feel as the little boy did—that I should have very little to say, anyway, when there are others no doubt more capable as to book learning, and also as to the knowledge of the craft. Well, let that be as it may; I have been thinking what may be of interest to some of the many readers of THE AMERICAN BLACKSMITH, and I could think of nothing better to tell you than that I am trying to put into practice some of the hints I have gathered from reading THE AMERICAN BLACKSMITH. Well, in order to fill up what spare time I have since the summer rush, I have been making some improvements in my shop and tools, so as to be as nearly up-to-date as possible. The floor of my shop was in need of repair, so I have replaced the old hemlock plank floor with two-inch oak plank, planed on one side and laid with one-half-inch lumber under, to cover the cracks and keep out the cold. It being laid with the planed side up, is easily swept and kept clean. I have also improved the west side of my shop, rather the worse for wear from the effects of the storms of the thirty-one years since I built the shop. I removed the old bottoms and this left a smooth surface. Then I covered it with common felt roofing material at a cost of $1.25 per square of 100 square feet. Then I nailed on three-inch planed bottoms, about fifteen inches apart, to hold the siding material in place. I

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then painted it with one coat of red oxide of iron, mixed with linseed oil, at a cost of fifty-five cents per gallon. I have put in some new tools, and have also taken out my two old brick forges and replaced them with a new style steel, down-draft Buffalo Forge, No. 666, equipped with a No. 200 blower. I set this forge in one of the corners of my shop, about eight feet from the wall each way, so as to be able to handle work from both sides of the forge.

Now, under head of "the good of the craft," I would say to my brother "chips-off-the-old-block" that there are two objects that we should keep in view:—first, get all the pleasure out of our business we can, and, second, a fair profit; and in order to succeed, we should keep our places of business always clean and orderly. Always meet our customers and others with a kind word and a smile of welcome, insist on fair prices for our labor, and give long-winded accounts the "go by."

A York State Shop and its Owner.

R. T. PARMELEE.

The accompanying engraving shows the interior of Charles H. Marshall's shop, which is 26 by 42 feet. Mr. Marshall came here five years ago. He is a skilled workman in every particular, a practical horseshoer, and a general repair workman. Nothing repairable comes to his shop that he can not make good. He is doing a good business, and is very well liked and much thought of in the community. He was brought up as a farmer, taught school ten winters, but took to blacksmithing. His prices are rather high, but he gives good satisfaction, taking a great deal of pride in doing his work well. He runs his shop six days in the week, and is always to be found in it, except when occasionally away on business. He was a Justice of the Peace seven years in Seneca County, and four years Justice of Sessions. He is an apt talker and quite a politician. He is a reader of THE AMERICAN BLACKSMITH, which he frequently quotes.

A Short Story of Thomas Blanchard, Inventor.—2.

DWIGHT GODDARD.

Blanchard immediately secured a patent and was paid by the Government to set one up at the Harper's Ferry Armory, and later at the Springfield Armory. The introduction of this machine opened up the way to others. Blanchard was placed in charge of stocking muskets at the Springfield Armory, and during the next five years introduced no less than thirteen machines for the better manufacture of muskets. The most important of these was a machine for making the irregular recesses in the stock for the barrel, lock, etc. The idea for this machine came to him, it is said, from watching a wood-boring insect.

Being thus occupied in Government work, opportunity was open to infringers of the patent to apply it in other ways. During the first term of the patent no less than fifty machines were put in operation for various purposes, turning shoe lasts, wheel spokes, tackle blocks and hat forms, from which he derived no benefit. The patent was originally granted about 1820, and twice renewed, a very unusual proceeding.

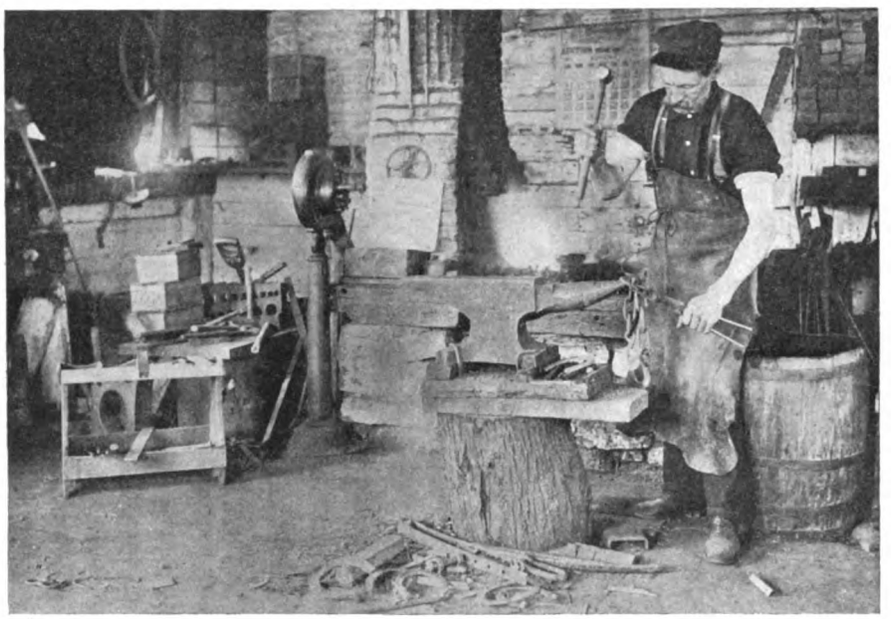
In the early history of this invention the question of reality of invention was contested by one of his neighbors. A hearing was granted, to be held on the village green. The neighbor, who was a brass worker by trade, presented a beautifully made model in brass, while Blanchard's model was a crude wooden affair, but the evidence was altogether in his favor, and little was heard afterward of this contestant for the honor of inventing the lathe for irregular forms.

Blanchard had many troubles in defending his patent, and even to the end realized but a comparatively small amount directly from the invention.

By this time Blanchard came to considerable repute as a mechanical expert, and was frequently employed henceforth in lawsuits and investigations.

In 1825 Blanchard became much interested in the subject of steam road wagons. While still at the Springfield Armory he made a working model that was very successful and for which he received a patent. He had ideas also about rails and turnouts, but his efforts to organize a company or secure capital, first in Boston and later in New York, having failed, he apparently abandoned the idea.

In 1826 an effort was made to improve the navigation of the Connecticut River. At first steamboats were tried, but the rapids were so great that it was a failure. Then a canal was built around the worst rapids, and Blanchard was asked to design a steamboat, which he did, but it was also unsuccessful. This failure deepened his interest, and he made an elaborate study of the whole question, the result of which was an important improvement. The improvement consisted in locating the paddle wheel at a particular distance beyond the stern, where the water set in with the greatest velocity. Hitherto the wheel had been located close up to the stern or at the sides. By Blanchard's discovery the maximum resistance to the paddles was secured, and a steamboat could be driven up rivers whose rapids had hitherto prevented steam navigation. He also built boats with two engines driving the wheel shaft by cranks set at 180 degrees on the ends, which



FORGING THE LINK—A YORK STATE SHOP RUN BY A FORMER SCHOOL MASTER AND JUSTICE OF PEACE

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secured the more constant power needed to ascend strong rapids. The result of his efforts was to move the head of navigation from Hartford to Springfield, and double the travel and transportation between the two places. He even navigated the rapids 150 miles beyond Springfield.

Proving that small rivers could be successfully navigated by steamboats brought Mr. Blanchard many applications for assistance. By 1830 he had boats running on the Allegheny and other tributaries of the Ohio, and so established his method of construction that it came into general use.

Mr. Blanchard made many other inventions; in all he secured twenty-four patents, one of which was the process of steaming wood for bending. Hitherto when bent sticks were required for ship construction and other purposes, the woods were searched for satisfactory timbers. The U. S. Government paid Blanchard $50,000 for the use of this patent in ship construction, and other uses, such as for slate frames and bent furniture, also rewarded him.

He also made inventions in woolen and other machinery.

Although he started in life under such unfavorable conditions, he won out in the end. He overcame his stuttering, improved his personal appearance, made up by observation and experience for his lack of education, and by his inventions changed his early poverty for comparative wealth. He was able before he died to fulfill an assertion made to the villagers of West Millbury, when in extreme poverty and youthful awkwardness he was railed against for his shiftlessness, that he would yet "drive up through here in a coach and four."

He died in 1864, leaving a widow; he had been married only ten months.

A Shattered Clock as a Collector.

I. C.

There was plenty of work at the little village wagon shop, but customers were slow to pay. Bills had been sent out, but no money came in return. More jobs came in, more stock must be bought, and stock already used must be paid for. A hundred customers could very easily relieve the one mechanic if they would, but they thought he could wait. A customer comes in with an old clock for repairs. It had been struck by lightning and badly shattered, but it was an old relic, and the customer wanted it repaired, if possible, and with but little expense. The "repairer-of-many-things" looks it over at his leisure, and hangs it on the wall, beside it hanging these lines:

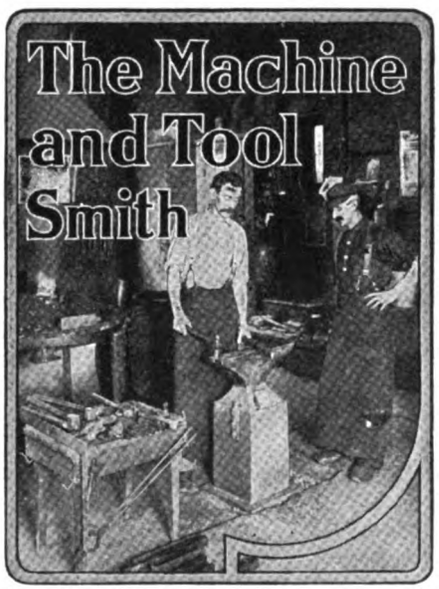
Behold these works as they now appear,
They have run on tick for many a year.
But one day lightning played a trick,
And now you see there is no more tick.

Now, time is counted here no more,
But it goes right on as it did before.
The works to the wall have gone alone,
The wheels have stopped, the hands are gone.

This is a lesson we all might heed,
Don't keep the money that others need.
Disasters come where ere you be,
It has come on time as you plainly see.

To many customers here about,
Don't keep your money on my account.
Beware of promises broken through,
There is always trouble when bills are due.

Collections began to "look up" considerably after this.



When working under the steam hammer be sure that all stock is laid solidly on the anvil and directly below the center of the hammer. Don't be afraid to strike heavy blows. A dozen light ones will never make-up for the one that should have been heavy. H. BERRY.

When doubt exists as to the proper heat for hardening, better to attempt a low heat than one that is too high. Then if the heat has been found too low, the piece may again be heated at a higher heat, whereas if a too high heat were used it would be impossible to detect the error and the tool would undoubtedly break when it was used for the first time. B. L. J.

It is important to observe that even the most careful annealing will not always completely put right a steel which has been carelessly or ignorantly treated. If, for example, the piece to be used for making the tool has been broken off cold from the bar instead of having been cut off warm, the very act of breaking it off may produce fine cracks, particularly in hard and thick steel. In all cases, too, a bar must be chosen as thick as the thickest part of the tool, so that the steel need not be bulged. F. R.

Piecework as a Successful Factor in Shop Management.

D. B. SWINTON. *

The first authentic record of piecework, known to us, is when the Israelites in captivity under Pharoah were allowed their provisions in return for making a certain number of bricks per day, and this system remains the fundamental basis of present day piecework. A man's efforts requiring him when on piecework to devote, for his personal advantage, more energy than he would were he paid straight time. The success of piecework as a shop principle depends largely on the amount of care and attention which the system receives from the foreman. Nothing can be more abused than improperly priced piecework, and the advantage of piecework can only be obtained when both employee and employer are taken into consideration when deciding upon the price to be paid.

In certain shops a system is in vogue which may give in a measure some satisfaction, but which for general purposes can hardly be recommended for general use. That is, in straight construction work. A man is engaged to make a certain piece at a certain price, but of course this interferes with the elasticity of shop management and prevents the swinging around of work in the shop that is sometimes found necessary. The system with which I am in touch, and which apparently gives satisfactory results, both to the men and the company, is as follows: While the company does not encourage a large percentage of gain in piecework over day work, they permit a man a maximum gain of 50 per cent. on blacksmith work, so that a blacksmith paid at a 20 cent per hour rate, can in a ten hour day, with properly adjusted prices, make $3.00, or an increase of $1.00 over his time. This, of course, applies particularly to a man conversant with his work and who, to make and warrant this increase, is willing to exercise more energy than he would were he working on a straight hourly basis. In placing a man on piecework, he is for all practical purposes being admitted to an active interest in the shop in which he is working, and as a certain article is supposedly worth a

*Read before the I. R. M. B. A. convention a Chicago.

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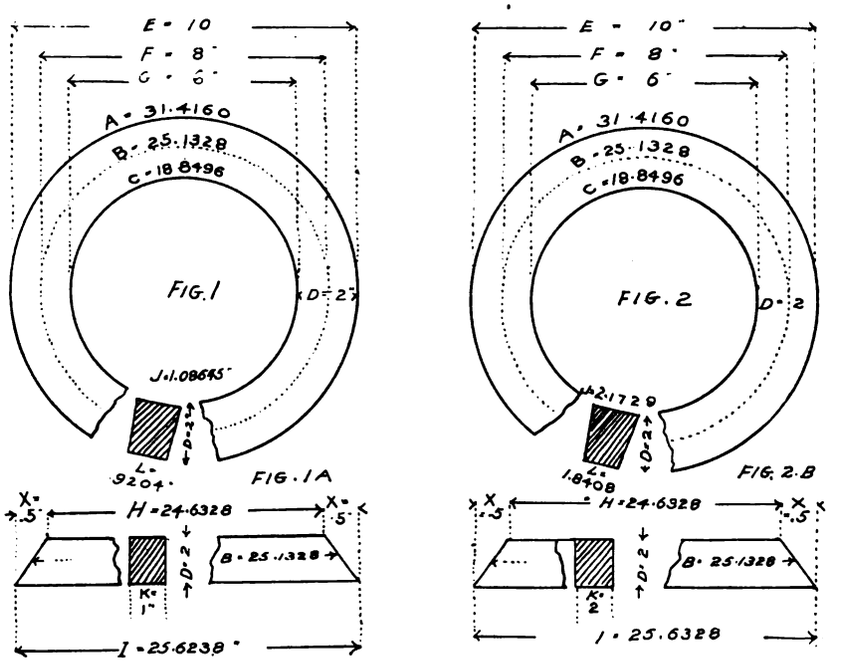
certain price to the company, he is assisting in the success of the shop by increasing the output of that article as well as benefiting himself financially.

In figuring on prices, I have always taken into consideration the actual amount of machine and manual labor required to make a certain article, the rate of the men performing the labor, and the nature of the work. A man working on cold work scarcely merits the same return for his labor as the smith who is working on heavy forging, where his physical labor is made particularly hard on account of the heat which he has to endure. Then, again, the actual cost of production by day work should be considered, as there is no benefit to anyone concerned unless the cost of the finished product can be reduced when placed on a piecework basis. After arriving at a figure which seems reasonable for all parties concerned, it is placed on record, and the timekeeping department is advised of the price after it has been certified to by the master car builders. Care is taken to have the price figured out carefully, as it is not considered creditable to a foreman to rectify his prices after they have been placed on record, although in a progressive shop where new ideas, tools, dies and machines are being constantly brought into service with a view of increasing the output and reducing labor, the scale of piecework prices existing prior to the introduction of an improved system should be carefully adjusted, and, when necessary, should be reduced so as to correspond with the improved condition.

In the Canadian Pacific Railway Shops, before any piecework price can be increased, reduced or placed on record, it is most carefully scrutinized by the master car builder, who satisfies himself that the price is just for all parties concerned, before he will authorized its issue. It is this constant care and scrutiny which has placed our prices on as low, just and satisfactory a scale, both to men and company, as any other shop on the continent. The count of pieces is made by each charge-hand for his particular section and a report of same sent in to my office, signed by the charge-hand. After my approval it is handed over to the piecework inspector, who is in the employ of the auditing department and who keeps a record of the time, rate, price and order distribution. He also keeps a check on the count, and should he so wish may request a second count to assure himself that all is correct.

Out of 220 men employed in the shops I have about 120 of them working constantly on piecework, and my opinion is that the output of any shop will be almost doubled by placing, wherever possible, a price on any article. It is not necessary that a man should be kept steadily on piecework all day, as if there is a price fixed on each article, it is easy to keep a record of the time required to do one or more kinds each day. I have recently placed prices on several general repair jobs with most satisfactory results, such as: Repairing knuckles, repairing brake beams, and other general repairs, which are almost standard work in a car or locomotive blacksmith shop. Where contract prices are at all complete, it is an easy matter to arrive at the cost of any particular class of work by adding the cost of the different units composing the complete article.

In my opinion, the benefits to be derived from piecework are numerous, some of them being: It increases output; prevents what is commonly known as "soldiering," for when a man has to depend upon his own exertions for his day's pay he will naturally put his best foot forward; it shows up "dead men," as it can easily be seen when a man is working on piecework, whether he is giving his best; it standardizes the work; as a man who is placed upon a particular job will rapidly develop into a specialist when he is allowed to use his judgment as to the best way to increase his day's pay; the work turned out by a piecework man has the benefit of being uniform; it keeps good men in the shop, as the steady men in a shop are the piecework men who, through fear of being replaced on their piecework during their absence, lose no time, unless justified in doing so.



A REAL FORMULA FOR CALCULATING STOCK FOR RINGS

Care should be taken and judgment used when it is found necessary to cut or reduce a price, as it is a well known fact that all men are not to be measured with the same rule, and it would not be justice to a man to reduce his price on piecework simply because he has through using his head, brains and body, been able to exceed the output of his predecessors on the same class of work. Indiscriminate price cutting is an evil to be avoided as much as possible. Care should be taken in the actual count being returned, and if men are made responsible for their work and obliged to replace any rejected material, it will force them to turn out no work but what is satisfactory.

In closing, some of my remarks may be open to criticism; at all events, I hope they are, as the primary object of this paper is to excite discussion in an amicable manner, so that we may all benefit by our mutual experience in this class of work.

Formula for Constructing Rings Made from Square or Flat Iron.

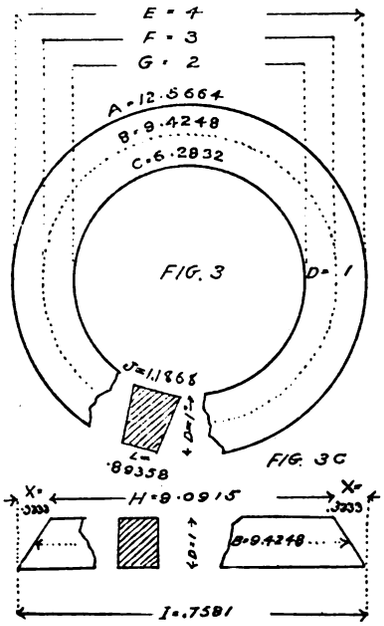
S. UREN.*

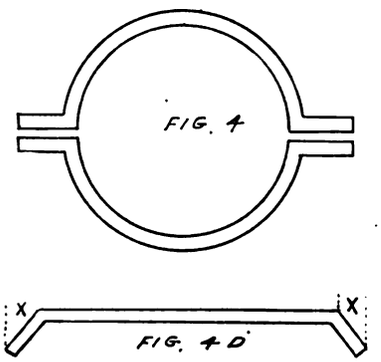
Many different methods are produced by practical smiths to determine the proper length to cut the straight bar.

* Read before the I. R. M. B. A. convention at Chicago.

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The carriage smith will either roll the wheel over a long bar of iron or will use a tire wheel and roll the outside of the wheel and the inside of the tire, making the allowance for the openings between





FOR RINGS MADE IN SECTIONS, THE SAME FORMULA APPLIES

the felloes, which method is absolutely correct. In a locomotive or manufacturing shop conditions are different, as the smith works from drawings and in many cases has no means of measuring the circumference the ring is to fit over. Oftentimes the ring has to be finished on all sides in the machine shop, and the proper allowance has to be made for finishing. Many smiths have different methods of calculating the straight length of the bar. Many use the old rule as 7 is to 22, so is the diameter to the circumference. Others take simply 3 times the diameter plus one-seventh of the diameter. Then again, others use the simple method of 3 times the inside diameter plus 3 widths of the iron. The writer's method is to use the formula 3.1416, multiplied by the diameter of the ring at the neutral axis of the bar. The above methods are practically correct, measuring from the center of the metal, but does not give the short and long side of the straight bar, as shown at Fig. 1 A, 2 B, and 3 C. I, as well as others, have searched mathematical and mechanical books for formulas that would give the different functions of a ring that has been bent from a heated bar of iron of given dimensions. I could not find anything bearing on the subject, consequently, Mr. Harkins, my assistant foreman, who is an expert mathematician, and the writer undertook to solve the problems, and have fully demonstrated and proved by experiments in actual practice of the formula. Fig. 1 represents a ring bent from a bar of iron 2 inches wide by 1 inch thick. The usual custom of the practical blacksmith is to cut the bar to the length produced by the formula 3.1416 multiplied by the diameter of the ring and guessing at the angle to cut the end of the bar. Oftentimes, after the ring is bent, the inside would meet, leaving an opening on the outside, and if cut in excess, similar conditions on the inside. In nearly all cases the smith will cut his iron long and trim to the proper shape after being bent. The formula of Fig. 1 A is simple and will give the angle. The end of the bar should be cut before bending. The difference of the long and short diameter divided by the sum of the long and short diameter, multiplied by the width of the iron will give the required angle. The result in all cases should be added to the length produced by the above formula and the angle cut as shown at Fig. 1 A. If the ring is not to be welded, the ends will come together forming a perfect joint.

It will be observed from Fig. 1 and Fig. 1 A, that the metal changes its shape in bending. The inside circumference of Fig. 1 is 18.18496 inches. The length as shown in Fig. 1 A, to produce the circumference, is 24.6328 inches, or 5.7832 inches in excess of the inside circumference of the finished ring. The reverse conditions exist in the outside of the ring. The actual length of the straight bar is 5.7832 inches shorter than the actual outside circumference of the ring, consequently the surplus metal has to be accounted for on the inside of the ring and diminished on the outside. The extra metal increases the thickness of the inside of the ring, as shown at section J, and decreases the thickness, as shown at L.

Oftentimes the smith has to make rings in sections, as shown at Fig. 4. The same formula will apply to produce the angle projections in the straight bar. The usual custom of the smith is to guess at the angle when forging the projections in the straight bar and set the ends properly after the section of ring is bent. The formulæ are correct, if the rings are bent at an even temperature and the metal has the same tensile and compression strength. Practically the metal has about equal tensile and compression strength at a bright red heat. When making rings from uneven shaped iron, such as T shapes or channels, the formula 3.1416 multiplied by the diameter must be figured from the neutral axis of the bar.

In Fig. 1, a 6-inch inside diameter is produced from a 1 by 2-inch bar. In Fig. 2 the same inside diameter is produced from a 2-inch square bar. The figure produced by the formula corresponds to the dimensions of similar rings produced in actual practice. Very few smiths realize that the length of the short side of the straight bar in a 6-inch ring, 2 inches wide, is 5.7832 inches longer than the inside circumference of the ring, and the long side as much shorter than the outside circumference.

Thornton's Letters.—3.

Being "Straight-from-the-shoulder" Talk from a Prosperous Selfmade Smith to his Former Apprentice now in Business.

DEAR JIM:

Your last letter was expected. I was surprised that you didn't mention the subject of home-made tools before. Now you just take this tip—paste it in your hat: The best method of making a good hammer is to buy one ready made. The same rule applies to all other tools that you can purchase cheaper than they can be made. A good, honest manufacturer can make a better hammer than you can, and knows just what to put into it, and how to shape and temper it and if you purchase honest tools, you will not only save much time, but money as well, in experimenting. There are plenty of good, honest hammers on the market and plenty of other good small tools, so don't try any false economy stunt by trying to make your own. Of course there are exceptions to this, but you know enough not to buy a tool which is

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likely to be used but once. That is the time to use your gray matter, and forge the proper tool for the job at hand. But as a general thing, you can spend your time to better advantage and to better profit by working for your customers.

Another thing I want to mention, Jim, is to be practical. As our Dear "Teddy" said a while ago, "A man to accomplish anything, must be practical." It is almost unnecessary for me to say that our President knows a thing or two about it. Don't try to saw wood with a wooden saw. It may be all right for a man to take an occasional trip to his air castle, but when it comes right down to making a living—a question of dollars and cents—he better stay right down on good old mother earth.

I just mention this by the way, so that you won't be starting on a job at the wrong end. When a farmer brings in a disabled machine, start at the beginning, and don't let up until you have fixed it. Study the situation carefully, and let common sense be the basis of your suppositions and calculations in repairing it.

Don't forget to make friends up there, Jim; they are important factors in every business success. There is no better relation than a prudent and faithful friend. Don't be afraid to tell them what you are doing in a business way. Of course you must use tact; don't brag, Jim. As somebody said, "Two pairs of sparrows will make more noise than a whole barn-yard full of hens, yet sparrows' eggs are not quoted in the market." The man who brags loudest about his business, is not necessarily the man with the biggest bank account. A business story told with apparent modesty usually goes the farthest. To make friends with your customers, keep faith with them—live up to every promise you make. If you cannot live up to your promises, don't make any. Remember that we make our money out of our friends—our enemies will not trade with us. And don't think that you won't have enemies up there. If you do anything at all, Jim, you won't be able to prevent this. The man without an enemy is usually one of these "milk and water chaps." So don't go weeping around because someone doesn't happen to like this or that action of yours. Ten chances to one the chap isn't worth having as a friend, in the first place.

In closing, just let me remind you of one of poor Richard's sparks: "Keep thy shop and thy shop will keep thee."

Yours,

THORNTON.

Dont's for the Craft.—6.

For all Branches.

J. B. BARNES.

Don't guess at anything—know.

Don't forget that time is money.

Don't ever say "It's good enough."

Don't knock your brother craftsmen.

Don't leave your tools lying all over the shop.

Don't think that no one can teach you anything.

Don't make a practice of "oiling up" during business hours.

Don't hustle and hurry your work at the expense of quality.

Don't ever talk against modern tools and modern appliances.

Don't show your prejudices against "new fangled machines."

Don't forget that every minute spent on a job increases its cost.

Don't put a lot of unnecessary "fuss and feathers" on any work.

Don't get excited over any job, no matter how particular it is.

Don't use poor, cheap material and expect the result to be A No. 1.

Don't make promises with little or no intention of keeping them.

Don't forget that a cool head is needed to manipulate hot work.

Don't talk too loud about your work—better perform work that talks.

Don't lose your temper when unsuccessful in performing some job.

Don't think that you know all there is to know about your particular work.

Don't forget that best work is impossible among piles of scrap and dirt.

Don't start operations on any job until you know what the result is to be.

Don't think that the sign over the door makes you a "Practical" craftsman.

Don't get the "swelled head" simply because you can do a job or two.

Don't fail to let your customers know you can do certain things exceedingly well.

Don't forget that the successful craftsman uses his head as well as his hand.

Don't think that well-besmeared overalls, or a well-torn apron, mean "busy workman."

Don't forget that every piece of work must carry a certain percentage of your expenses.

Don't think that there is only one method of doing certain work because you know but one.

Don't think that because you have done certain work a certain way for ten years that it is the best.

Don't forget that a reputation for square dealing is worth more than any petty "extras" you may make.

Don't say, "It can't be done," unless you have tried, and then better ask someone better posted than you are.

Don't condemn any machine, firm or brand of goods without a thorough test, and even then be careful of what you say.

How to Fill Sarven Wheels.

A. R. PACE.

(Prize Contest)

I have been filling Sarven patent wheels for ten years, and this is the way I do it. Remove all the flange rivets, take out the old spokes, put a coat of carriage glue in the mortises of the hub, place your hub on the anvil with the point or small end up, and put a three-quarter-inch bolt through the square hole in the anvil the proper length to reach through the hub and receive a strong iron washer and tap. Screw down moderately tight, but not to press the flanges together. Prepare the spokes by coating with glue. Put on a second coat of glue in each mortise as you drive the spokes, driving one spoke up, and the second up opposite the first. The third spoke is half way between the first and second, the fourth opposite the third, and so on until half the spokes are driven. On the last half aim carefully not to drive the spokes too tight, so they will press sideways and drive the spoke opposite as in the first half. The last spoke to be driven should be very tight. Before driving the last spoke, wrench down the nut on top, press the flanges together, drive the last spoke tight, bore holes for rivets, drive rivets; now take out bolt, turn wheel with big end of hub up, put bolt through the square hole in anvil and hub, put on iron washer and nut and wrench down tight. Drive a steel wedge on top of anvil and against the rivet to be headed and, with a light hammer (about a six-ounce), head up. Do same to other rivets, until all the rivets are headed. This kind of a job satisfies my customers.

Burning the Paint from an Old Vehicle.

A. PAINTER.

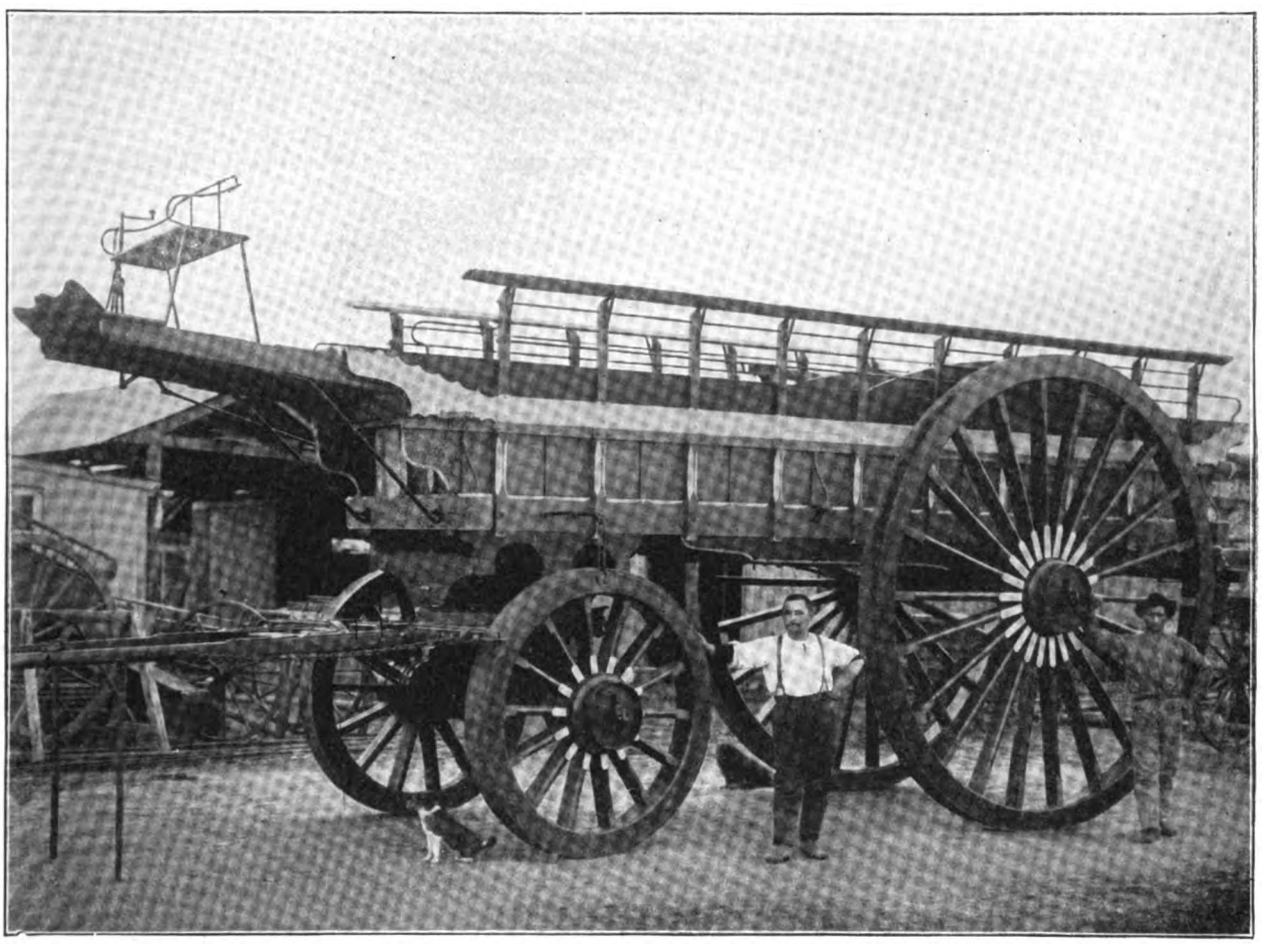
The outfit required for the operation consists of a good torch, two putty knives, a leather apron with a large bib

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and a pair of old gloves. The torch must be first-class, if a-number-one work is to be done. There are a number of good torches on the market any one of which will last for years with proper care. But care it must have to work properly and successfully. The torch should be carefully cleaned and polished before putting away and any old oil should of course be removed from the tank. In short, the outside, inside and every part of the lamp should be made thoroughly clean before putting away. Accidents and explosions are less likely to occur with a clean torch than with one upon which the dust, dirt and oil has been allowed to collect.

The putty knives should be of two sizes—one large one for large surfaces, and the other small for getting into corners and narrow spaces. The apron is for the protection of the workman. The bib should come up well around the operator's chest, while the gloves are to protect the hands. If it is possible to secure gloves with gauntlets or sleeves, so much the better. The proper precautions and preventive measures will naturally bring the liability of serious injury from accident down to a minimum.

We are now ready to work. If you use the scraping or putty knife in the right hand, begin burning or softening the paint at the right edge of the painted surface. This will allow the softened paint to be scraped toward the unburned portion of the panel and the removed paint will be thrown onto this part of the surface. In softening the old pigment, the flame of the torch is directed upon the hard surface only long enough to soften it and permit its being easily removed with a knife. Should by any accident, the surface of the panel be scorched or charred, the entire charred portion should be removed until the surface is clean. A vehicle from which the old pigment has been carefully removed and whose surface has been put in the best possible condition is very likely to be painted in like manner. However, a most careful preparation of the wood surface will by no means make-up for errors that are likely to occur in any of the subsequent operations.



Courtesy American Thresherman.

THE WAGONS FOR HAULING GRAIN IN THE ARGENTINE ARE OF GIGANTIC PROPORTIONS

THE IMMENSE WAGON PICTURED AND USED IN THE ARGENTINE REPUBLIC WEIGHS SEVENTEEN TONS. THE HIND WHEELS ARE ELEVEN FEET HIGH, AND FROM EIGHT TO TWENTY HORSES ARE USED FOR HAULING THIS VEHICLE

What Goes to Make a Good Blacksmith.

MICHAEL BREEN.
(Prize Contest)

To be a good blacksmith a man must be intelligent, thinking, well-read, educated, well-trained, and have a taste for the business. He must have a knowledge of chemistry, or at least the chemistry of the materials he is working. He should know geometry and mensuration, and be good at figures. If called upon to shoe a horse, he must know the anatomy of the horse, or at least his feet and limbs. He must have a good, well-trained eye, both in head and mind, for measurement and design, so that when he sees a design he must be able to take it all in. He should be able to design and draw and put his ideas on paper, and be able to work from drawings. He should have well-trained hands,

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and be able to adjust himself to all conditions and circumstances and be in no way afraid of hard work. But seldom do you find the man, who thinks himself a good blacksmith, answering to all these points. Be that as it may, let all aspire to as many of them as he possibly can.

I meet men from time to time who possess many of these points and make use of them. To these I say "Well done," and I am sure all brother smiths would say so, too. But I meet other men who do not possess many of them. They have brains and intellect to be sure, but they let them rust away for want of use, education, and training. To these I say, "Wake up, you can cultivate in yourself many good things. Try it, you will be surprised at your own progress." Others destroy there brains through drink, become lazy and of little good and will not put their minds to work. To these I have nothing to say, as it would be a waste of words. All I can say about them is that they are mostly great "vicemen," and they "defile" all about them. And still others work hard and contented enough, but have no taste and never finish a job with a mechanical appearance. To these I say, "Cultivate a taste. It can be done. Put a little care into your work. If you have no tools fit to work with, make them so. You cannot do work without them. You can make them all yourself. Make them well, handy, strong, and wearable. Don't make clumsy lumps of iron that are a load to lift. Above all, make their working faces carefully and accurately. Finish them well, remember tools are an index to your abilities. Nothing looks better than a good set of tools. Be careful in using them. Keep a good clean fire and clean the scale off your job before you put a tool on to finish it. If a thing must be square, have it square. If it must be round, have it so. Don't have your work neither oval, round, nor square. Train your eye to graceful curves and straight lines. Don't be satisfied with a badly finished job. Do your best at every job. Some jobs may not pay for being too particular with; but do all in your power to finish the job well and make it pay at the same time." Still other smiths can make a shining job, but it is sure to be a misfit in some way. To these I say, "Be accurate in your measurements, use your rule, your compasses, your calipers, use your straight edge, your square, and your bevel. Don't let your levelling block rust for want of something to do, as it is on this that most of your work should be tried. See that all parts fit as intended before you allow them out of your hands." To those who make a good job, but lose too much time over it, I say, "Cultivate a smart turn in yourself. Don't be so long stooping to your tools. Don't be so long crossing the floor. Don't let your heat cool while going from the fire to the anvil." Some men are very good at the fire, and no good at the anvil, others are the reverse. To the men who are wanting at the anvil I would refer the foregoing remarks. But to those who are wanting at the fire, I would say, "Don't get into the habit of putting down fresh slack when you are raising a heat, remember it is the coke that heats. Keep your fire free from burnt out ashes, slag, and other dirt. Make your fire to suit your work. A small fire for small work, and a large fire for heavy work, and a blast to suit both. When your iron begins to fuse, increase your blast. This is the time the fire requires more oxygen to support it."

Other men are good at neither anvil nor fire, and yet they call themselves smiths, and even undertake to train apprentices. These men can read the pedigree of a horse or dog for generations back. They go to hunts and races for miles around. They can dance, sing, and play, which by the way are very good accomplishments, and good for recreation, but to live by them one must be a professional. To these men I would also like to give a word of advice. "Give more of your time to your trade if you intend to live by it. You are doing an injustice to yourself and your family, as you do not earn your own or their support. You do an injustice to your apprentice for he is to be pitied when he goes out into the world from such a shop as yours. You have wasted his time. You do an injustice to your customer, as you seldom or ever can give him value for his money. And last but not least, you do an injustice to the trade; you bring a slur upon it; make little of it and you lessen it in others' estimation."



A SCENE FAMILIAR TO THE LOVER OF THE SPEED HORSE.—THE TROTTER IS MADE NOT WITHOUT THE ASSISTANCE OF THE CAREFUL SHOER

I have now screwed the nut down fairly tight on the boss, but have taken the pressure off some other place. So we must also give the apprentice a dig or two. When you become an apprentice you must have your mind made up to learn the trade at all costs. The first thing you have got to do is to find your own place and to keep it. You must respect your boss, his family, and his customers. You must not play tricks on any of them, nor laugh at, or enjoy any trick played on such people. It is not manly. You must not laugh at all you see and hear. If you are told any business secrets, you must keep them and not speak of them to anyone. You must be in the shop at the proper time, and if you have any spare time you must utilise it in cleaning and making the shop tidy and in learning all about it, and the tools, etc. Do not idle

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your time, especially in the absence of the boss, as he may often go out to give you a chance to improve yourself and you should take such a chance. You should be very attentive to the boss or anyone he places over you. Listen attentively to what is said to you, and look attentively to what is shown you. Make it a rule to be bidden or shown a thing but once. Remember that it aggravates a boss very much to have to tell you a thing again and again. If he has to reprimand you for anything you do wrong, do not think the worse of it; remember he has a right to do so, for he is responsible to his customers, and not you. Be ready and willing to do his bidding. Do not say, even to yourself, that you know as much as he does. For you will never know much if you are of that turn of mind. If you want to get on,

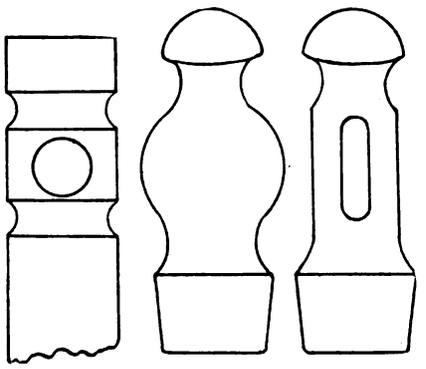
Be always ready at a call,
And act obligingly to all.

I must now conclude my poor remarks, as the thought strikes me "Twill be wasted." I see a difficulty in getting them to the ears of some of the people for whom they are intended, for they are seldom found reading THE AMERICAN BLACKSMITH, or any other work that would be of any use to them. Some people may laugh at some of my remarks, but that does not matter, I sincerely hope some will profit by them.

Tempering a Hand Hammer in a Blacksmith Forge.

VULCAN.

There are three things prepared before hand: one is an iron mandrel of one-inch or 1⅛-inch iron, about eighteen inches long, and forged on one end to fit the eye of the hammer snugly; the second is a collar, punched with a taper pin, or the hub of an old pulley (either will do so long as it circles the face of hammer closely). The last article is an old pan that will hold a quart or two of water, when the water is about one-half inch deep. Have fire well coked, as green coal is death to steel. Heat slowly and thoroughly with a good body of coal. Dip at as low a heat as will harden. The higher the grade of steel, the lower the heat required. Then brighten the face and peen ends of hammer. Heat the above mentioned collar and mandrel to a white heat, so as to run the temper quickly. Insert mandrel in the eye of hammer while you encircle the face with hot collar. Watch closely, and when the color comes purple on the edges, the center of face will be a bright straw color. Dip face in receptacle prepared, and wait till peen comes to a dark straw color. Then dip peen, and replace face in water to finish cooling.



A HAMMER MUST BE CAREFULLY TEMPERED AFTER FORGING

If you wish to make hammer jet black around the eye, have some plumbago (black-lead) and oil mixed to apply with rag while hammer is cooling.

The Best is Always the Cheapest.

C. W. METCALF.
(Prize Contest.)

The best is the cheapest, although a great many people don't believe this is true. But, for an example, we will take farm implements. A young man starts in farming for himself, with a small capital, and he wants his money to bring him value received, and he will come to you and say: "Mr. Smith, what is the best figure you can build me a wagon for?" "Well, John, that depends on what you want to pay. I can make you an A number one wagon for $75 complete, or one for $50." "Well, Mr. Smith, what is the difference in the two?" "The $75 wagon is made from the best grade of material, from start to finish, and the other is made from D grade and cull stock, and I do not guarantee it at all, while the $75 wagon is guaranteed for five years." Now, which is the cheaper? The $75 wagon of course. And if he wants a harrow, he wants the one that he can make the ground look like a garden, although it may cost a "V" more; but it is the cheapest, for it saves one trip over his ground. And when he buys a plow, he wants one that will turn the earth bottom side up. If he wants a horse that he can work and drive to town and back in the same day, will he buy an old plug? Of course not. And, if he has any repair work done, he wants the best material that you can furnish. It is the cheapest, although it costs a little more, because it will wear enough longer and doubly pay for the cheap, inferior quality. While another man is always looking for a snap, and all he gets is the snap, while the other man gets the goods.

And it's the same with the blacksmith. When he buys a stock of iron, he wants a grade that will satisfy his customers, and he buys the best. He won't use a piece of common iron where a piece of Sweedish or Norway will answer the purpose a great deal better. If a man wants to prosper in business, he will not mingle with cheap goods, for they are dear in the end. If you use cheap goods and do your work cheap, and it doesn't give satisfaction, the purchaser does not feel like paying for it. But good goods and a fair price make him happy. If you want an engine, if you want a trip hammer, if you want a drill, if you want a good man, get the best; don't buy cheap goods, for they will do you no good. It is just like planting pumpkin seeds and expecting to get a fine crop of watermelons, to take inferior stock and expect to make good substantial implements of any kind. You can't make a wagon out of basswood and expect it to hold as big a load as one made out of A No. 1 hickory. Lots of smiths buy cheap stock because it works easy and doesn't cost so much sweat to work it. I would advise the craft, if they want to do cheap work, to use the best material that you can get, and then take pains and work it up in mechanical style, and you will find that is the cheapest and the best.

The Apprentice Question.

The Reason Why More Boys are Not Apprenticed to the Blacksmith Trade.

MICHAEL BREEN.
(Prize Contest.)

This is a very difficult subject to handle. All I can do is to give my opinions, the outcome of my experience in many parts of this country, and what is applicable to this country may, to a certain extent, be applied to other countries also. Judging from what we read of Tom Tardy in THE AMERICAN BLACKSMITH, it may also be applied to the land of "Struggle and Strife," or at least some of what I am about to say. There are three reasons for apprentice troubles: (1) There is a notion abroad, especially amongst parents, that the blacksmith trade is too low for their children; that there is not enough intelligence displayed in it or called upon. (2) That it is too

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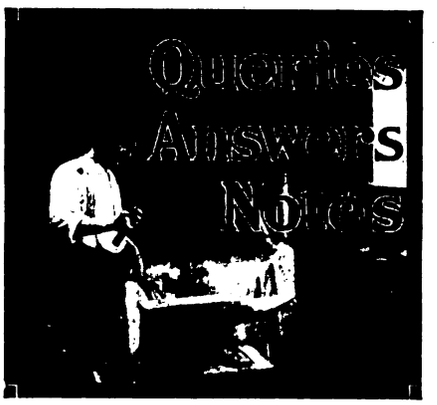
dirty a business, too much drunkenness, and that there is nothing heard or seen in the forge but what is unfit for boys to hear or see. (3) That it is too heavy a business, with little or no pay for the hard work, in proportion to the way that other tradesmen are paid.

The reason that the blacksmith trade is thought too low and no intelligence needed is because the blacksmith is sometimes pictured as a big, ignorant giant, who is as harmless as a child when sober, but when he gets drunk uses his sledge-hammer fists freely. He is said to be a man who earns his money like a horse and throws it away like an ass. He is said to be a drunken sot, who only works at odd times; a botch who does not require any more intelligence to do his work than a common unskilled laborer. This may be the case with some but not with all. The picture leaves a very bad impression, and the result is a lack of apprentices to the trade. The remedy I would suggest is for the smith to respect himself. Let him hold up his head and look about and use the brains God has given him. If he is big, all the better. But let him be big in mind as well as body and limb. Let him never be satisfied with what he knows but let him create an appetite in himself for knowledge. Let "Improvement" be his motto and let him show to the world that his trade requires more intelligence than any other, that he is the father of all trades. Do away with the British and West British notion, that the thinker must rule the toiler. Show to all that the toiler can also do some thinking.

The reason the blacksmith is thought dirty in body and mind is because there are such. But they are, I am very glad to say, few. The sooner these men rid themselves of the fumes of alcohol (except to drive their engines), and ventilate their shops with pure atmospheres for body and mind, the better. There is no good in it otherwise and this is the remedy I would suggest for objection number two.

The third objection is that the trade is too heavy and not enough pay for the amount of work done. And, therefore, only boys who are strong and robust are put to the trade and who are said not to be smart enough for anything else. Their intelligence or taste is never consulted. In some shops, no doubt, boys serving their apprenticeship get a great deal of unnecessary hardship and unnecessary labor. Some men have no tact for lightening labor. No mater what the job is, they have a piece of iron double or treble what they want, and have the helper work it down. This is one of the many instances where time and labor go to waste. You often hear boys say that they would rather help one man for a week than help another for a day. This shows where the difference is. The remedy I would suggest for this complaint is, use your intelligence and your mind to calculate your stuff. Use all the labor-saving appliances within your reach. There are a good many of these to be had very cheap, and many of them a smith can make himself. When you get an apprentice do not keep him helping all the time. Keep him only as long as it is necessary to teach him how to help and how to learn how to keep a fire, etc. If you find him looking over your shoulders into the fire while you are raising a heat, don't snap the nose off him for so doing, as I have seen men do. Show him all you can, and give him all the instructions you can, and if you have a trade secret do not hide it from him. Treat him with kindness, but with firmness. Let him contract no bad habits, and if you have got to be sharp with a boy, be so by all means. But don't let bad temper rule your actions, treat him with kindness at the same time and he will respect you for it. Make him a workman as soon as possible, 'tis all the better for yourself, and when he is able to work, give him charge of some job, but of course with discretion. Consult with him and show him that you have confidence in him and he will have confidence in you, and also confidence in himself. This is only your duty. If you do otherwise you do him an injustice. Don't think that by giving him anything you know, that it will take anything from you. On the contrary he may give you back tenfold, as some young minds are so keen when started to develop, there is no knowing what one can learn from them. If you find your boy fond of trying experiments don't check him except you are sure it will come out a failure, or it inconveniences you very much. And if you find a boy has no taste for the trade, send him away and do not waste his time and your own. Boys have wonderful influence over their comrades, and are always talking of how they are treated. When treated badly they will tell it, and so deter other boys from going to the same trade, and vice versa. This is my experience with boys, and I have had a good deal to do with them in my time, and some of them have turned out to be "Stars" now in America.

As to the objections of not being paid; the remedy for this is organization. Get a good price for your work, and pay your journeyman a good wage; a system that THE AMERICAN BLACKSMITH is advocating. I need not speak of organization in this country (Ireland) for our time of hope is past; it is now a country of shopkeepers and a dumping ground for all the world. But in America where work is plentiful it is the only thing for you. This is a statement in which I am sure any Irishman at home or in America will bear me out.



The following columns are intended for the convenience of all readers for discussions upon blacksmithing, horseshoeing, carriage building and allied topics. Questions, answers and comments are solicited and are always acceptable. Names omitted and addresses supplied upon request.

Wants a Brake for a Sled.—Will some reader of THE AMERICAN BLACKSMITH kindly give me a description of a brake for a sled? By so doing they will greatly oblige. N. C. LEES.

Wants to Make an Axle Gauge.—I would like very much for some of the brother smiths to tell me how to make an axle gauge. Any information along this line will greatly oblige. C. S. BOTTUM.

To Clean a Basket Top.—I would like to know through the columns of THE AMERICAN BLACKSMITH the best method for cleaning a basket-top governess cart. I desire to renovate it and revarnish it before retouching. ADAM ADAIR

Several Questions:—I would like to know where I can get a knife maker's vise; also where I can secure the best steel for knife blades. I would also like to know how the factories temper springs, and also where I can secure steel for springs. B. D. JOY.

Welding Wide Tires.—I would like to know how to weld wide tires 6 by 1 inch by 6 feet in diameter. To weld them solid in the center as well as on the edges. If some American brother would inform me I would consider it a great favor.
A. NIEDERMEYER, Australia.

Facts for Horse Owners.—One of "Our Folks" in Australia desires to secure a copy of "Facts for Horse Owners" by Magner. If any of our readers possess a copy and are inclined to part with it, kindly address me, stating price and condition of book. We understand that this book is now out of print. THE EDITOR.

To Cure a Stalking Mare.—Can any brother blacksmith tell me how to cure a mare that stalks a little in the hind

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legs? This is a little out of the trade, but as it is for my own good, and as most blacksmiths are good horsemen, I will appreciate this information very much. CHAS. MORRELL.

Moulding Iron at The Forge.—Can some brother tell me how I can do molding or casting iron and brass in my forge? In Scotland, men went around to the smithies and recast old shoes and side plates, and molded them for ploughs, but I have never seen them work at it. I hope that some brother smith will be able to give me this information. P. D.

A Raise in Prices.—I give some of our prices we have been getting: 75 cents for plain shoes, 85 cents for toed shoes, 30 cents for reset all around, and the 20th of this month we commence to shoe for 80 cents plain, $1.00 toes, 50 cents reset, and we have all concluded to stand together on this price. H. F. FINNEY.

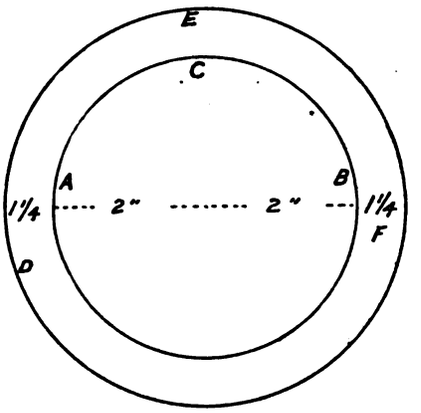
Wants to Weld Flues in Traction Engines.—I would like to know through the columns of THE AMERICAN BLACKSMITH, how to weld flues in traction engines or where I can secure this information. I am a blacksmith but have had chances to repair machines. I have been at the trade five years. Can some brother reader give me the above information? OSCAR PERSON.

Wants Best Shoeing Stocks.—I would like very much for some brother smith to tell me which shoeing stock is best for use in shoeing wild horses. I live in Indian Territory and have some very mean ponies to shoe. My shop is 20 by 30 feet. I have two forges, one cold tire setter, one emery wheel, one disc sharpener, one post drill and many other small tools, and do all kinds of horseshoeing, wagon and buggy repairing. I like THE AMERICAN BLACKSMITH very much and do not think there is anything better of its kind. R. S. BENSON.

Wants to Know a Special Process.—Can some brother give me directions to temper an edge tool made from spring steel? I have a screw driver bit made 21 years since, in constant and hard service most of the time, which was made from a piece of buggy spring. It has not needed overseeing since made. The same smith, working for me, made a set of header and matcher machine-bits from a piece of bus-spring, which were the best I ever saw. I want to know the process of tempering. My smith would not tell me his secret process for pay. J. T. LAVEIGNE.

Uses Printer's Ink Freely.—I use lots of printer's ink. I have had post cards printed and have sent them to all persons whose names I could secure. I also have very neat business cards, and whenever I hear of a picnic or gathering of any kind I fill my pockets with cards, and place a card in every buggy, wagon or saddle, beside handing them out freely to the people. I also had 100 cards, size 6 inches by 12 inches bearing the following: "Please close the door, and when in need of repairs go to Boyd's Buggy Works." This is the way I started and I still continue to expend money for printer's ink. JAMES F. BOYD.

That Stock Cutting Question.—I saw on page 238 of the September number a query, the substance of which is as follows: It is required to find how much, or what length, of a four-inch rod it will take to upset it and make a flange six and one-half inches in diameter and three inches thick. It will take four and ninety-two hundredths inches of rod, not allowing



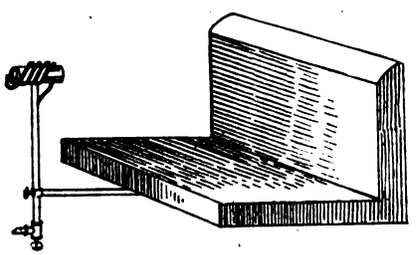
THE STOCK FOR A FLANGED RING MUST BE CAREFULLY FIGURED

for turning and cleaning up, since that may be a variable quantity. The operation is as follows (See diagram): Let A-B-C represent rod, diameter of which is four inches. The flange D-E-F is upset from rod and is one-fourth inch wide, and three inches thick.

Surface of flange and end of rod $(6.5)^2 \times .7854$ ..... 33.18315 sq. in.
End surface of rod $(4)^2 \times .7854$ 12.56640 " "
Surface of flange alone ..... 20.61675 " "

Thickness of flange, three inches. 20.61675 x 3=61.85025 cubic inches, or contents of flange. Area of end surface of rod, 12.5664 square inches. 61.85205 = 4.92 inches of rod required to be upset to make flange, not calculating for waste or turning, etc., which may vary. M. I. DUTRO.

Plans of a Brazing Torch.—I have brazed stock, seven-eighths by five-eighths with it, but you must have a good pressure. In the hood is a lining of sheet asbestos. The hood can be made out of sheet iron, to confine your heat as much as you can. I



A HOOD WILL CONFINE THE HEAT

used one-fourth-inch pipe for my coil, and about three feet is what you want of it, or four or five coils around tubing. By having a good heat when you coil, it will flatten some. That makes it better, as it will not let so much gasoline generate at once, but you still have full pressure. This torch was fully explained in the June paper. WILL WARREN.

Several Shoeing Questions.—In reading my AMERICAN BLACKSMITH, I see that there are a couple of men asking questions on horse shoeing and I thought to myself that it would not be any harm in it for me to ask a few. My first question is, the proper way to fit it, to bring the foot to the shoe, or the shoe to the foot. Second question is, the proper way to shoe a horse that strikes with the side of the foot between the first and last nail, to shoe him with a common shoe. Next question is, to shoe a horse that strikes. He is low and narrow on the inside quarter, and wide on the outside. Will some brother help me? JOHN A. BATE

A Wisconsin Letter.—At this writing, business is good. I do a rgeneral repair business, but my work is nearly all horseshoeing and cage work, with good prices and nearly all cash trade. I have a well equipped shop with most all modern tools, and a good clean stock of wood and iron, and aim to turn out work satisfactorily and to please good-paying customers. As for the dead beat, I cut 'em out. I give them a small limit, less than a dollar, and no more unless cash in advance before I commence the job. I never do work for trust when there is a cash job in view. The crops here in general are mammoth; and the prices for stock and farm products are very good. WM. KEELY.

To Cure Forging.—I received my journal for the month of September and see a great deal about forging. My way to prevent this evil is to dress the front foot well at the toe and make the toe calks low and the heels high and the hind shoes high, toe calks and heels low. By this way of doing, the front feet have not so much surface to raise over while the hind feet have to raise over more before he can throw his foot ahead, and this gives him a chance to get his front foot out of the way. I have been shoeing horses for 32 years and am still learning every day and think a great deal of "Our Journal," and think every young horseshoer ought to read it regularly. JESSE CORNELIUS.

A Couple of Suggestions.—Helpful in extracting tire bolts from buggy wheels: When tire bolts are "stuck" and hard to get out place a heavy hammer, say an eight-pound sledge, against the threaded end of the bolt, and with a common, light hand hammer, strike a sharp blow on the tire on either side of the head of the bolt. This will often "bring" them when nothing else will. Try it, brother smiths.

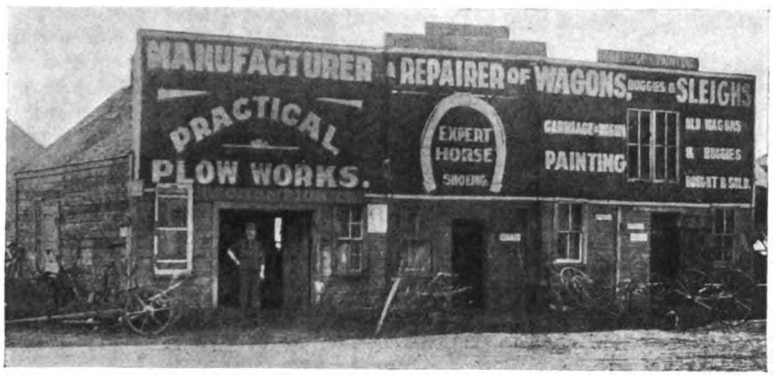
I use a Reynolds Tire Bolt Machine for removing and putting on the nuts. Better get one, brother repair-man. If you haven't got the money, borrow it. It will pay for itself in time alone by the time you have used it on twenty wheels, and is much easier to operate and handle than a monkey or an "S" wrench. J. W. ELROD.

To Drill Chilled Castings.—I noticed in a late issue a brother smith inquiring about drilling chilled castings. If he does not care to soften the spot where hole is wanted, let him take a small, big mouthed bottle, and put it into an ounce of oxalic acid, add to it spirits of turpentine enough to a little more than cover the acid. Use small mop and keep cutting point of drill wet with this mixture. He will find he can drill holes through glass or any metal harder than the bit he uses. Wipe off bit clean after using. If he wants to anneal a spot just big enough to drill hole through, take

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wet fire clay and work to consistency of putty, place finger or thumb on point and build up clay around finger, remove finger and fire cavity with sulphur or brimstone. Burn it slowly over forge. When burnt out and slowly cooled, the chill will be found taken out of the spot and it may be readily drilled. J. T. LAVEIGNE.

A North Dakota General Shop.—I have been in the smithing business for twenty-five years and am doing very good. I employ a wood-worker and a blacksmith all the time. We do all kinds of wood work, carriage work, general blacksmithing, carriage and wagon building, horseshoeing, plow work, vehicle painting, carriage trimming, saw-filing, and do furniture repairing and upholstering as a side line. Our prices are most all very good. The town here has about 3,500 people and the country round about is being settled very fast. Large car shops are located here. The accompanying engraving shows my shop. JAMES SPERBECK.



A NORTH DAKOTA SHOP WHERE GENERAL SMITHING IS DONE

Several Questions are Asked.—I would like to have some of your correspondents tell me the best varnish brushes. Also would like to know if anyone has tried Prof. J. W. Beery's Pulley Breaking Bridle to make a horse stand still. If it is good, I want one, as I am a horseshoer, but not very brave.

An old painter told me one day that with a caliper he could make all kinds of designs, and the only thing that I know I can make with a caliper is a star. So, I would like to know if I can buy a book that explains how to make designs with a caliper.

I would like to know if this is good: I saw an old carriage painter; after burning a body he would take some lard and a little varnish mixed; then put that on body and try it good with the lamp. Can that do a good job? I would like to know the best way to keep varnish brushes. I keep them in varnish, but the varnish gets like gum. I use a good varnish—Valentine's, but it soon gets gummy. THEODORE MELANCON.

On Specialists.—I would like to reply through your columns to that article by W. J. Mayers, classification of work, or specializing work in the shop. His view may be all right from his standpoint. His specialized smith will be only a tool. He wants piece work as the best method of making specialists. The reason for such a request is that the work turned out by those master smiths is as rough as the steel castings that go to make the modern locomotive. The method of demanding so much work in a given time has infringed on the quality and finish of the job. Now, under the piece work system, they can demand quality and finish on a price based below the minimum of the present cost. The specialist is then rated, and, if he goes over that rating, he is cut.

Brother smiths, express your views on this. The so-called master is not always a smith. He is a specialist on one kind of work. Come, brother, let us hear from you. This involves our daily bread, and you should be heard. JAMES M. RILEY.

Returning the Compliment.—In the November issue of The AMERICAN BLACKSMITH, I was pleased to note so many articles of material benefit to the art of blacksmithing. I have been a reader since its first issue, and have derived much benefit from the close reading of its pages. A general rise in price of horseshoeing, to which end The AMERICAN BLACKSMITH has shown the way, has been the result in this locality. I also noted that brother R. O'Hearn passes some unfavorable criticism on the tool, in the August number, which I brought to the notice of such of the craft who have nothing better to remove rivets from bow sockets that are broken. He says: "Mr. Nablo's effort will not do at all." I can only point out to Mr. O'Hearn that this same tool has removed hundreds of rivets and never needed repairing, so that is a curious result from what he says "won't do at all." If Mr. O'Hearn places his device on the market, I myself would be tempted to give it a trial, just to see how much it's ahead of a tool he claims is no good. I am no more in the blacksmithing line, having worked for over forty-five years at the business, and would not advise anything to my brother craftsmen that I thought or found to be worthless. Still, I am willing to be criticised in any statements I may make, and willing to be corrected when wrong. GEO. NABLO.

Regarding that Clinch Weld.—In regard to Mr. R. O'Hearn's article in the October issue, on page 23, on clinch welding: I will admit that it is out of date, but a man can't get so wise but there are others that are wiser. Just stop and think of it. It puts me in mind of a man I went to work for one time, and he said that he wouldn't have a man work for him who couldn't weld a mower pitman at one heat without riveting it together, and I said, "Do you always do that?" "Yes," said he, "I never fail." "Well," said I, "you never got hold of a hard steel Buckeye Pitman, have you?" "Lots of them," said he. I said, "It's my opinion that you will fall down some day." And before the day was out it came to a show down. He got it, and at the eighth heat, he gave it up. "Now," said I, "you always weld them at one heat, do you?" "Now, my friend," I said, "there is just one way that you can weld that Pitman, and no other." I was only a boy then, but I said: "If you want me to tell you, I will tell you so you can weld it without any trouble." "How would you go at it?" said he. I said: "You heat your Pitman and upset each end to regular size, and weld a piece of Swede iron on one, and then weld the two together. Otherwise you can do nothing with them." I knew, for I had experience. He did so, and had no trouble. I never heard any more about his one heat welding, although I do lots of one heat welding. I have found steel that absolutely could not be welded at one heat, nor a scarf weld in the last year, and I have worked at the trade for over 25 years now. C. W. METCALF.

That Rope Shoe and Horse Power.—I just received the October number of "Our Journal," and find lots of good reading. Mr. Geo. Vedder shows a horse shoe with rope packing for the prevention of slipping I have seen rope shoes used as late as 1884 over in Germany. The shoes were made of maleable iron. The rope was imbedded in the shoe itself, just inside the nail holes, all the way around the shoe, and left the sole and frog of the foot exposed. This was a very good shoe, and held good for two or three resettings. The rope was held in a channel, which channel was slightly closed up, after the rope was placed in, to hold the rope. One draw-back the shoe had, it was very bulky, though light. The rope could be renewed, each time slightly smaller than the time before, compensating for the wear of the shoe itself. The shoe was fitted cold to the foot, just closed or widened out, as the case demanded. The shoe in the October issue does not seem very practicable. If the rope packing is made heavy enough to stand a little above the shoe, it will press on the sole too much and not on the wall. If made too thin, it will not accomplish what it is intended for.

I will tell you of a little trick I had to do some time ago on a carriage axle. The thread on the right stub was twisted off, and stuck in the nut. I filed the axle arm square, drilled a hole one inch in diameter, about two inches deep. I then made a pin, cut thread all the way on the pin, and screwed in the hole, drilling one-fourth inch hole through the axle arm and pin, put a steel rivet in, put my wheel on, put on the nut, and the wagon is running today. I was not allowed to take the axle out of the wagon and weld my stub in; the owner had objections to moving the point, and did not believe that a man could weld steel. I drilled the hole with a "Wonder Drill" and a common brace.

The question on H. P. by Mr. Maxwell: A lever 12 feet long actuated by two horses, the other lever 18 inches long. What do the horses pull? Say both exert a force of 3,000 pounds, then power=144 inches x 3000 or 24000 pounds. FRANZ WENKE.

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Prices Current — Blacksmith Supplies.

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All prices, except on the bolts, are per hundred pounds. On bars and flats prices are in bundle lots.

Bars—Common Iron and Soft Steel.

¼ in..	round or square;	Iron,	$2.95;	Steel,	$2.95
⅜ in.,	"	"	2.55	"	2.40
½ in.,	"	"	2.35	"	2.20

Flats—Bar and Band.

¼	x 1 in., Iron	$2.40;	Steel		$2.40
¼	x 1½ in., "	2.30;	"		2.30
3-16	x 1½ in., "	2.50;	"		2.50

Norway and Swedish Iron.

¼ in., round or square	$4.90
⅜ in., " "	4.50
½ in., " "	4.30
½ x 1 in	4.30
¼ x 1½ in	4.20

Horseshoe Iron.

For No. 1 shoe, ⅜ x ½ in	$2.50
For No. 2 shoe, ½ x ⅝ in	2.50
For No. 3 shoe, ⅝ x ¾ in	2.50
For No. 4 shoe, ⅝ x ⅞ in	2.50

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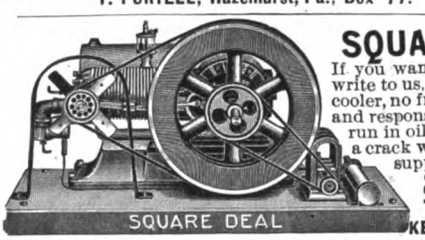
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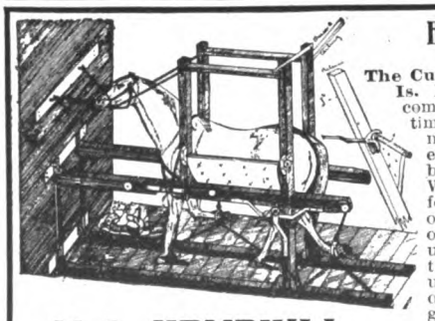
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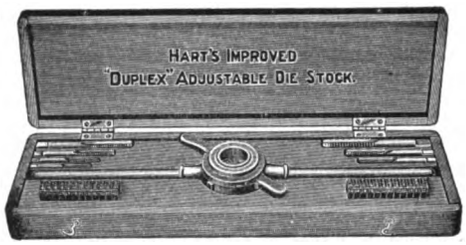
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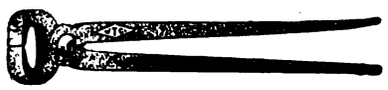
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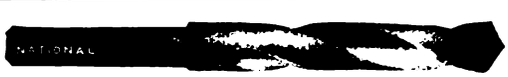
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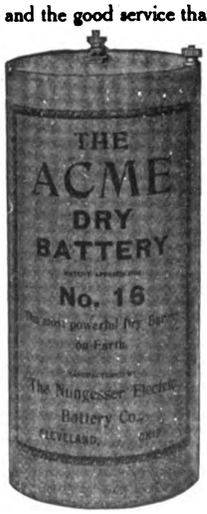
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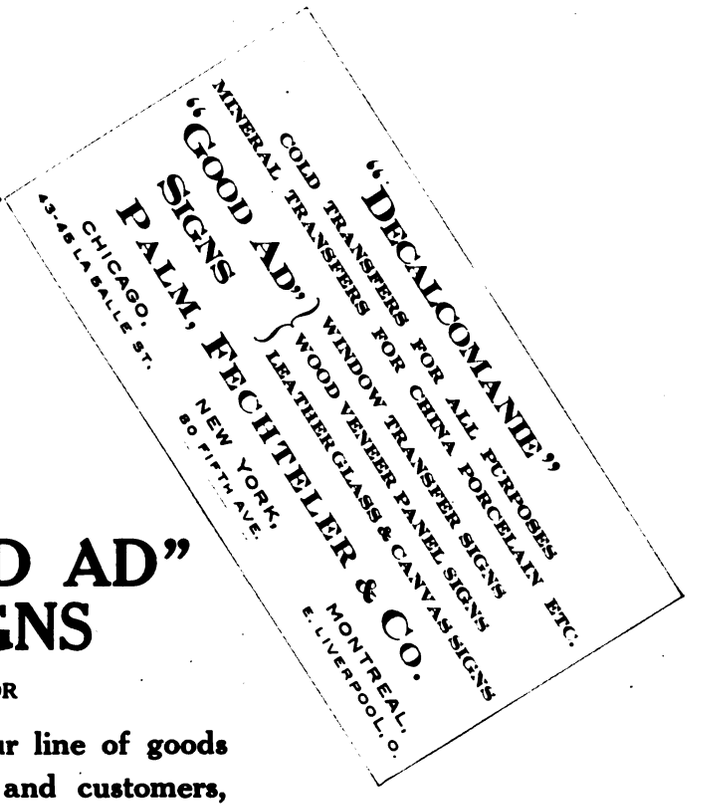
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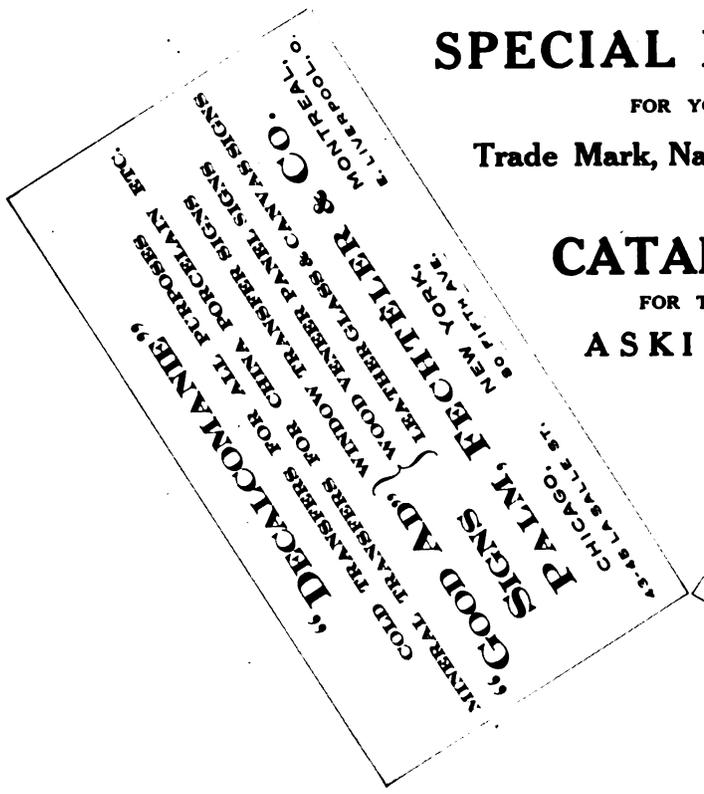
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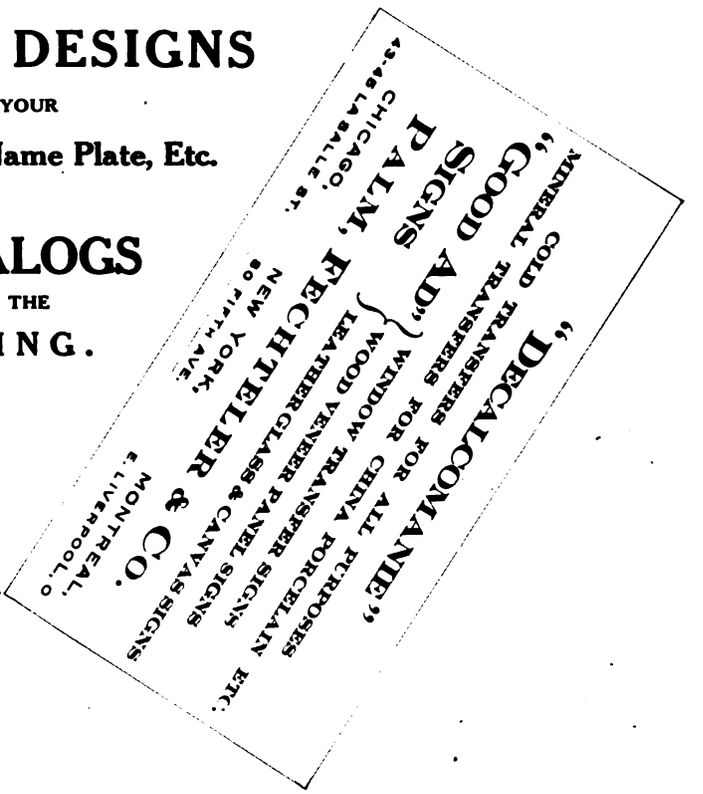
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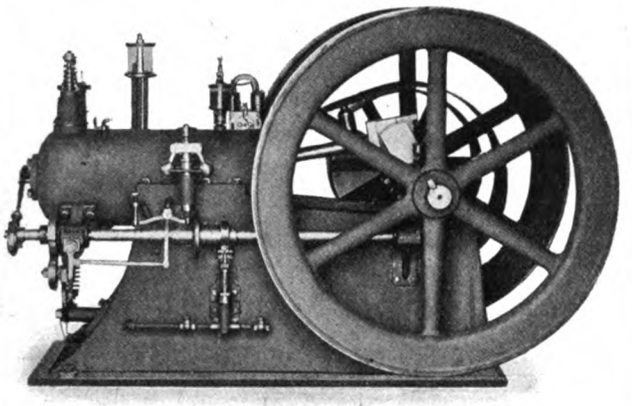
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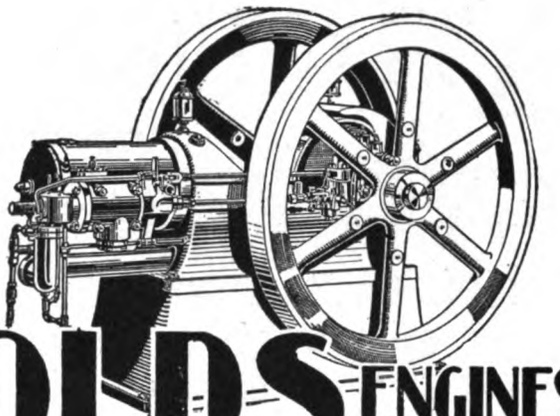


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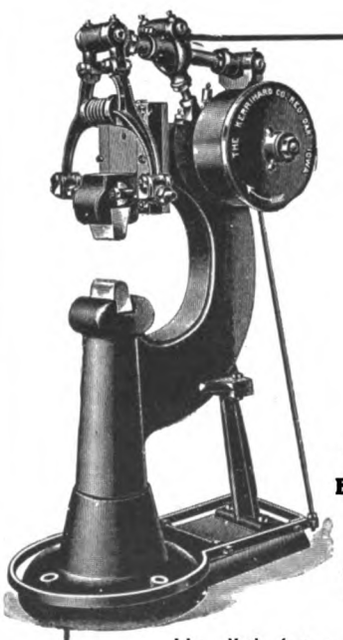
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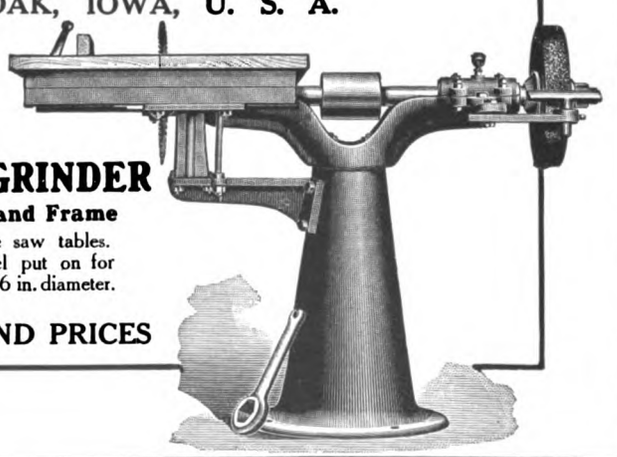
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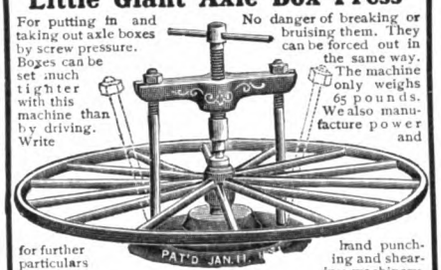
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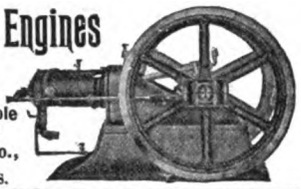
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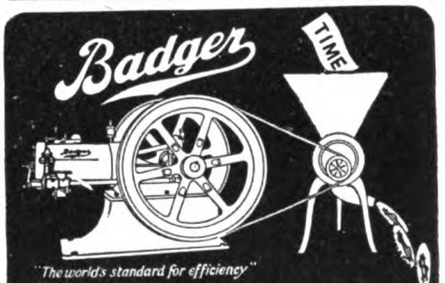
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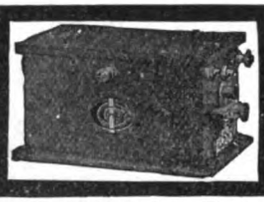


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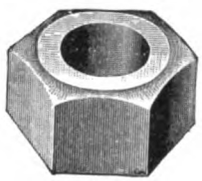


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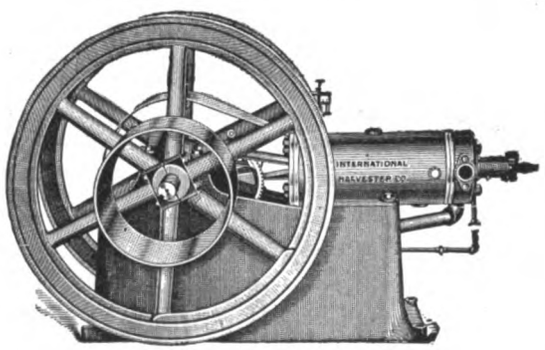
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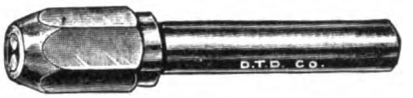
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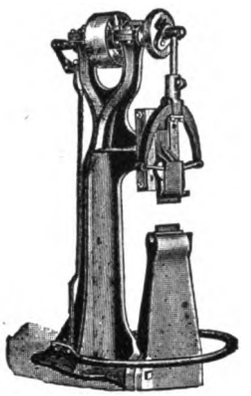


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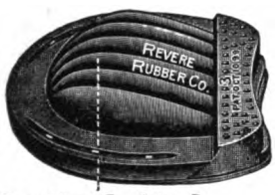
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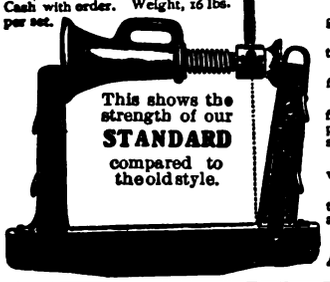
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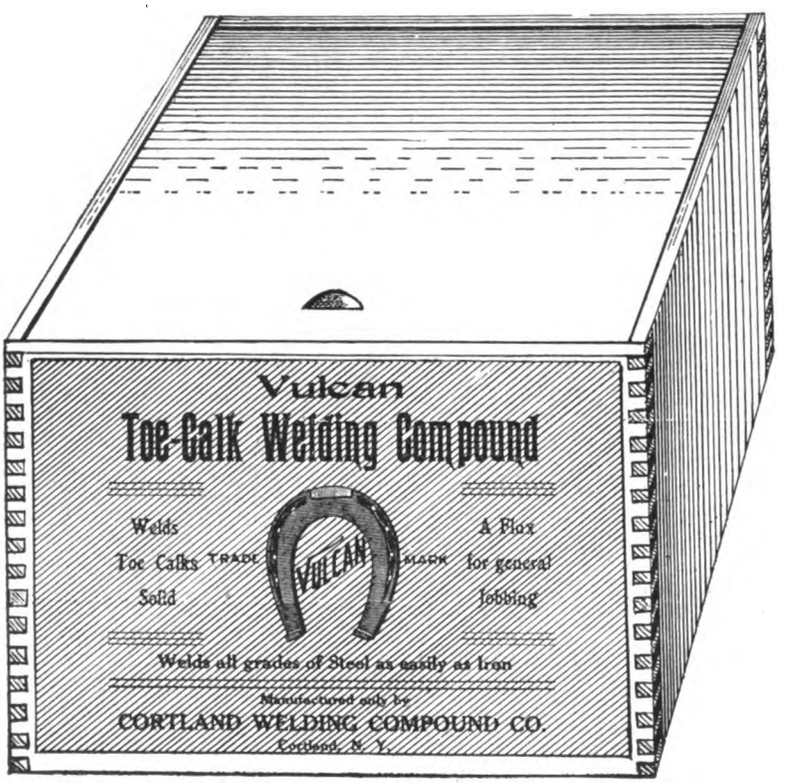
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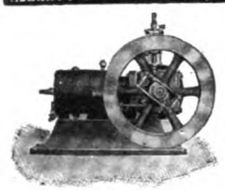
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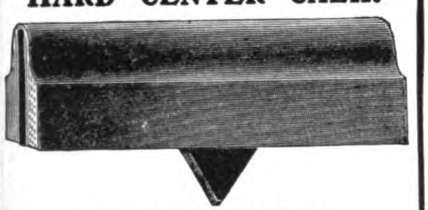


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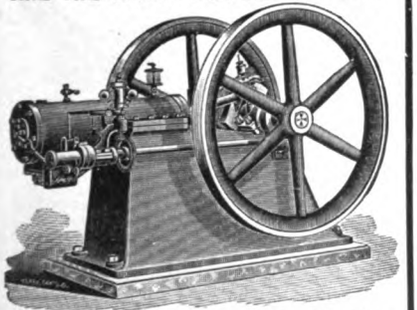


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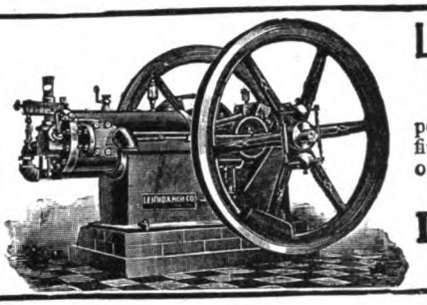
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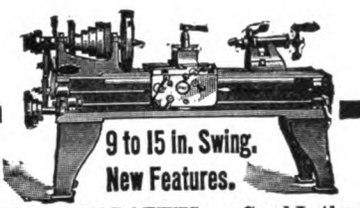


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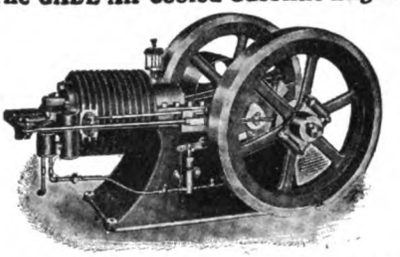
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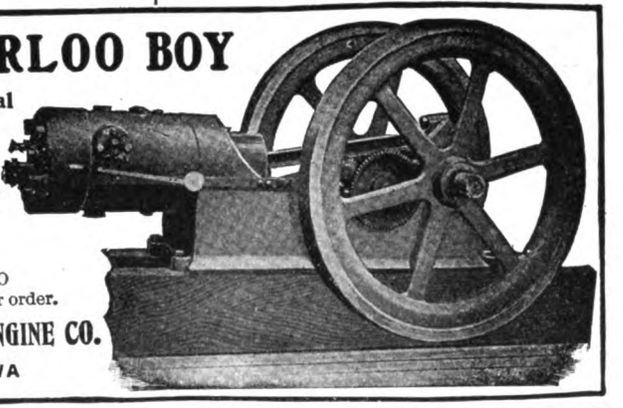
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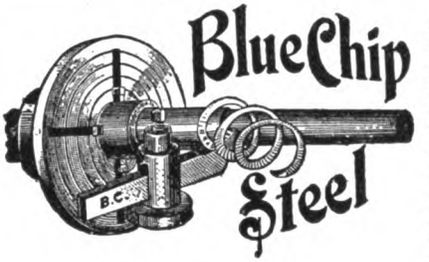
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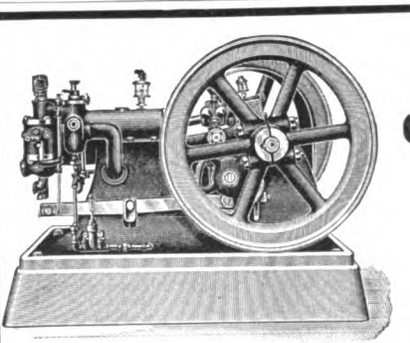


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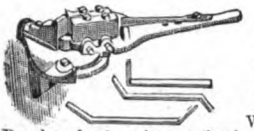


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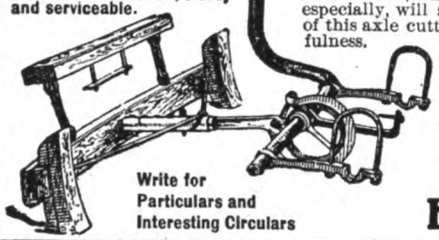
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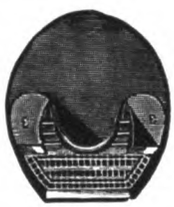
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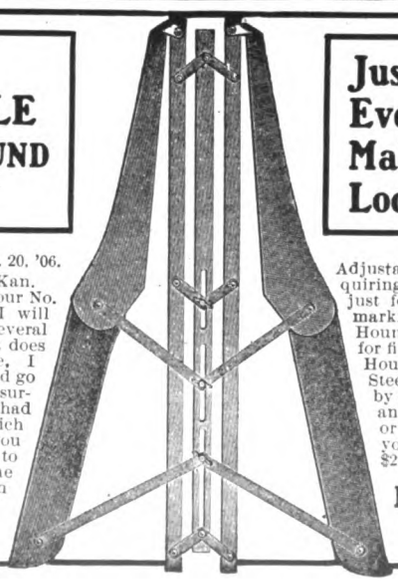
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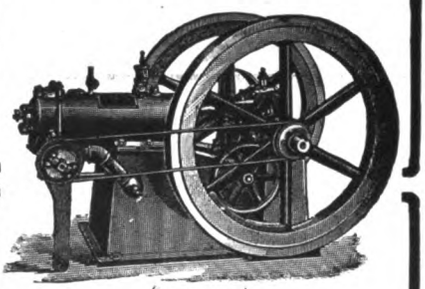
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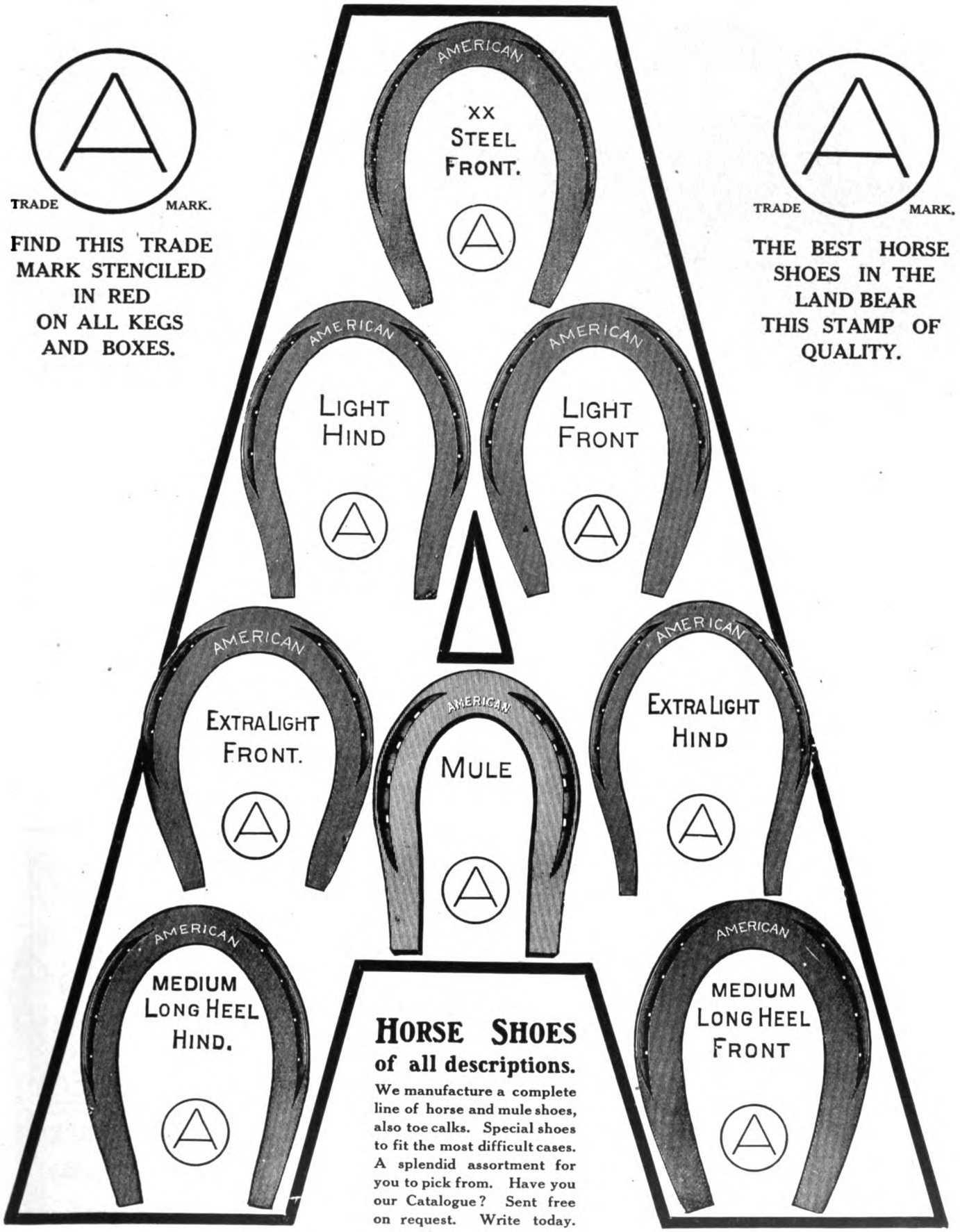
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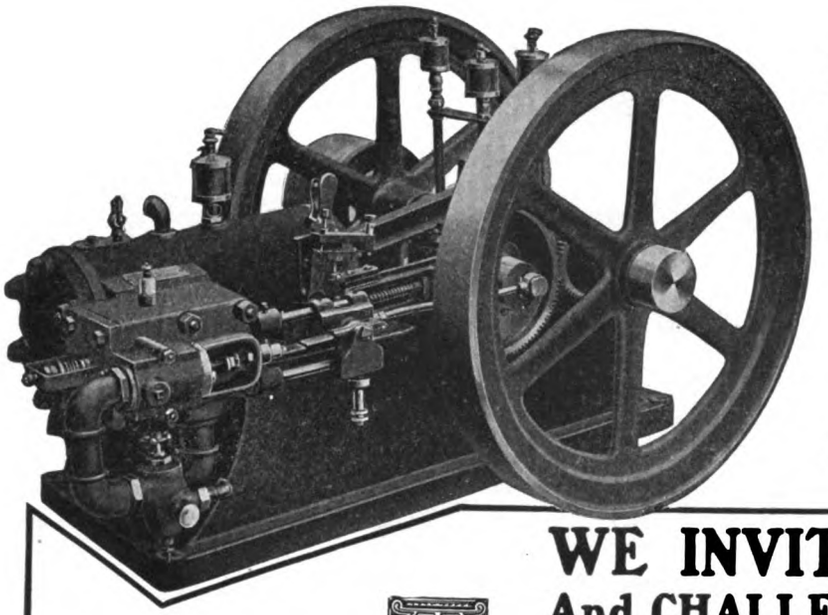


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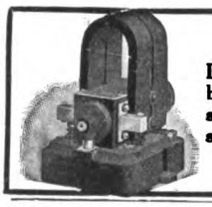
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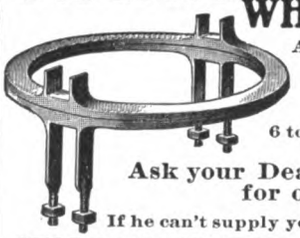


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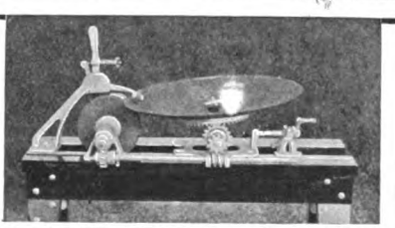


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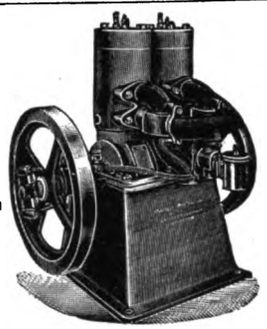
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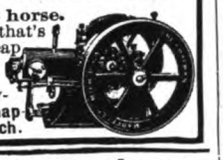
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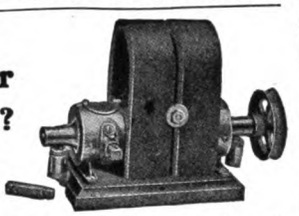




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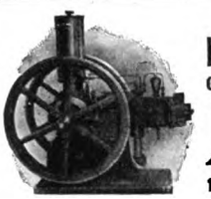
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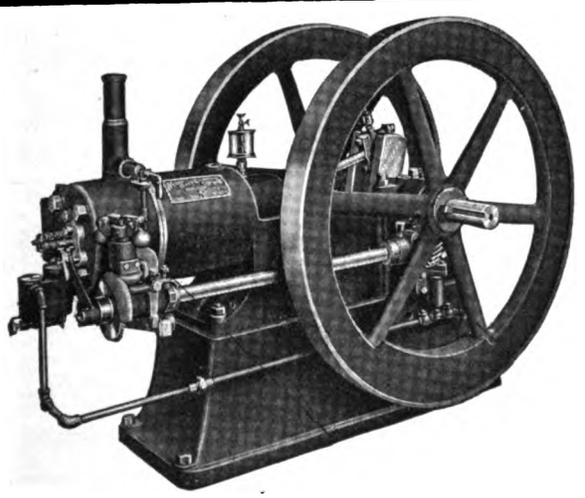
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We have engines running blacksmith shops in every state and territory in the Union, making money for their owners every day in the year.

Increase your business and overcome competition by installing an up-to-date reliable Weber engine.

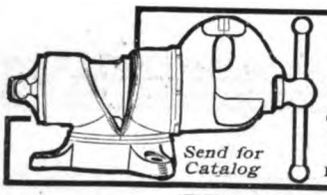
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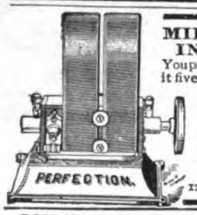
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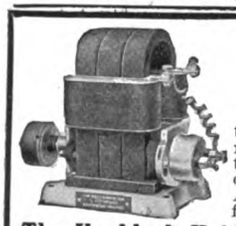


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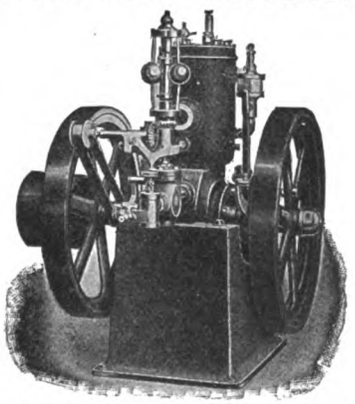


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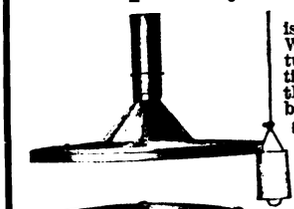
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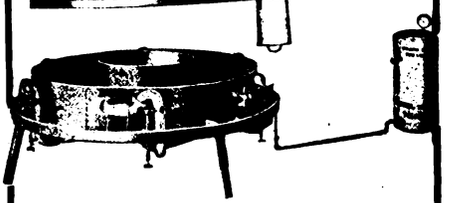
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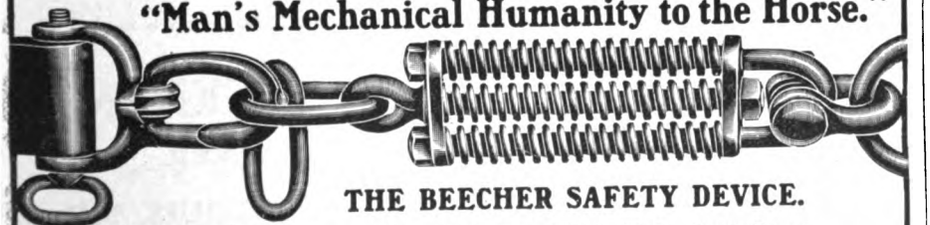
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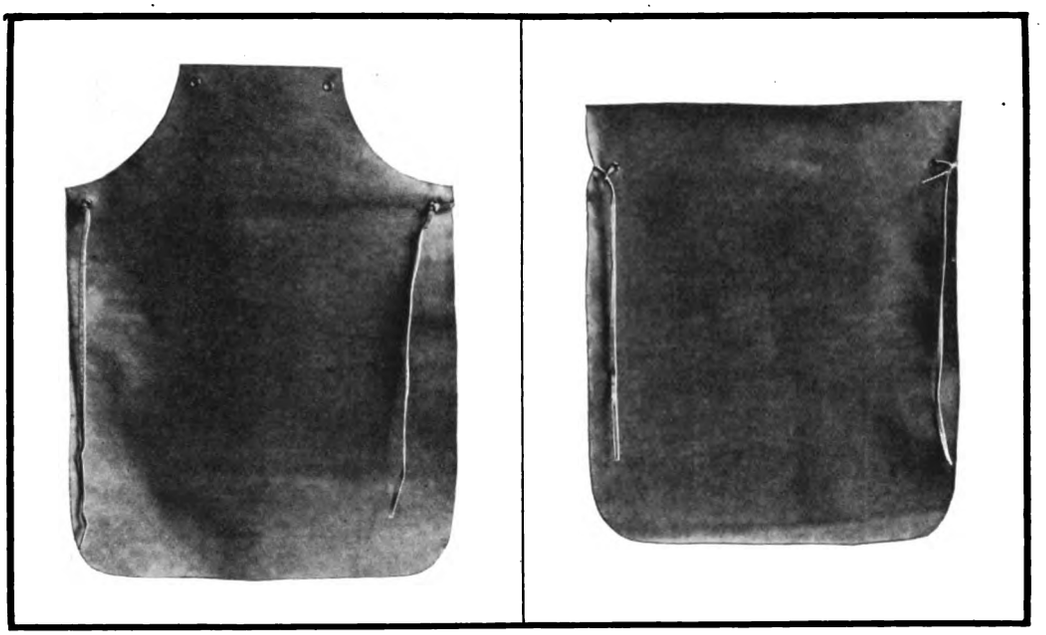
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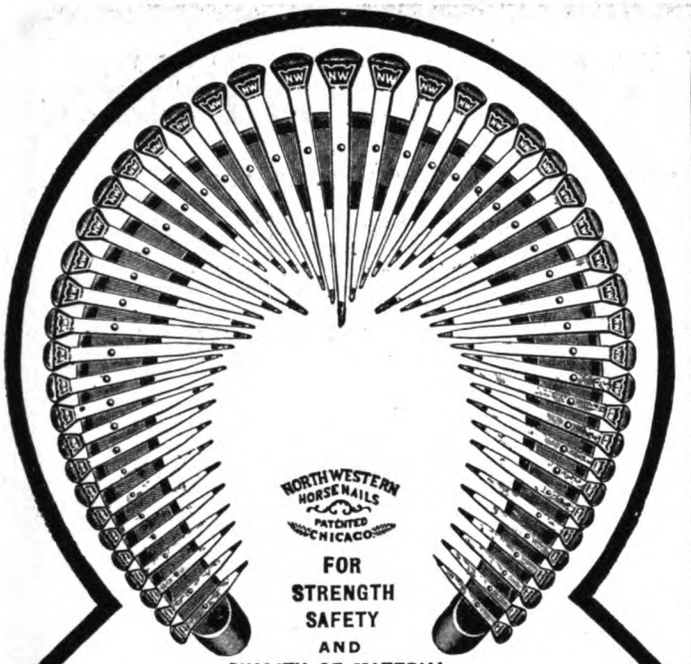
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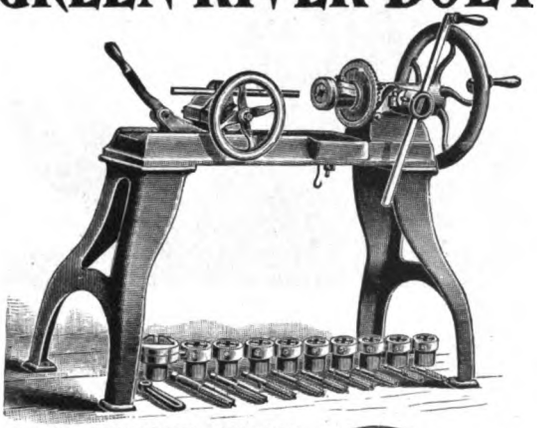
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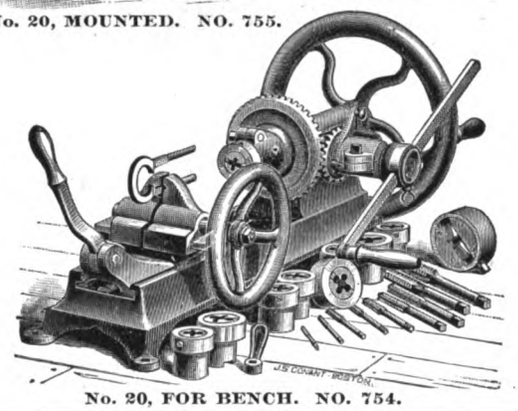
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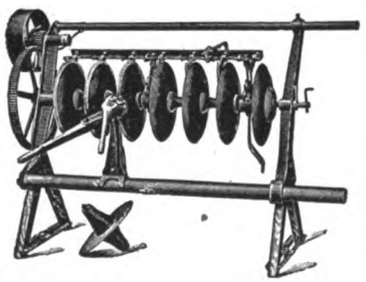
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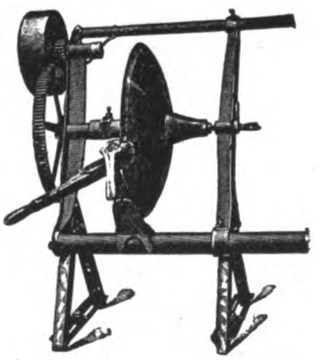
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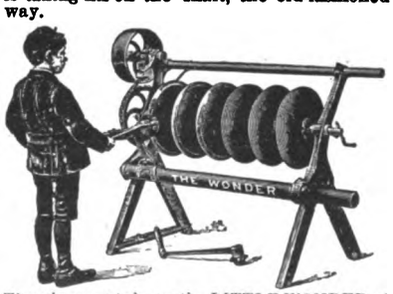
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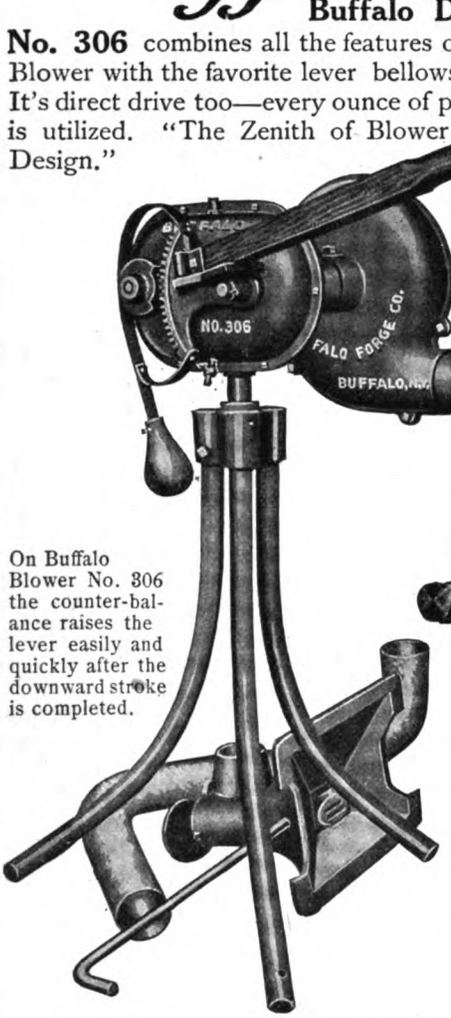
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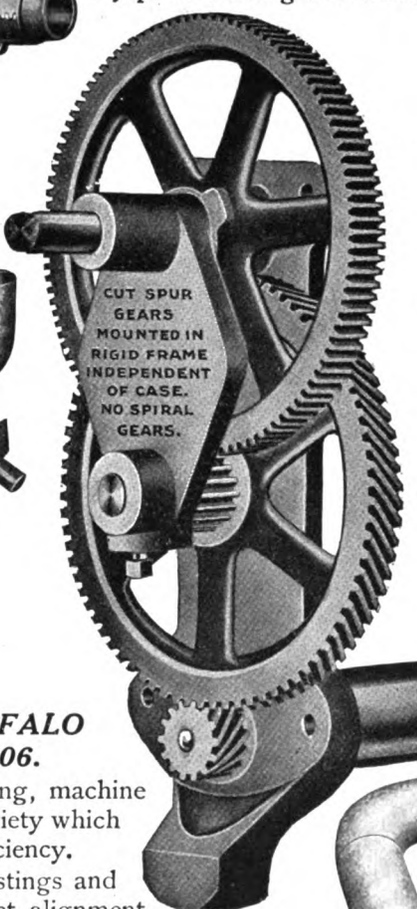
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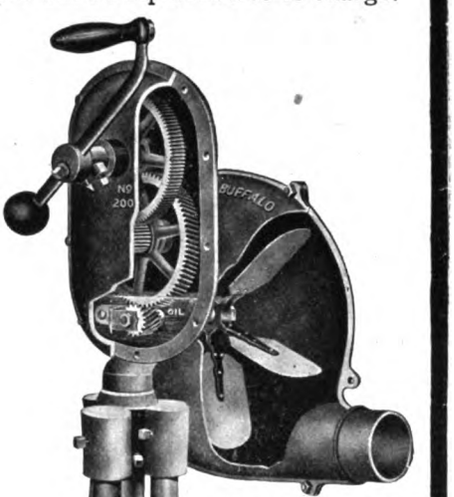


On Buffalo Blower No. 306 the counter-balance raises the lever easily and quickly after the downward stroke is completed.

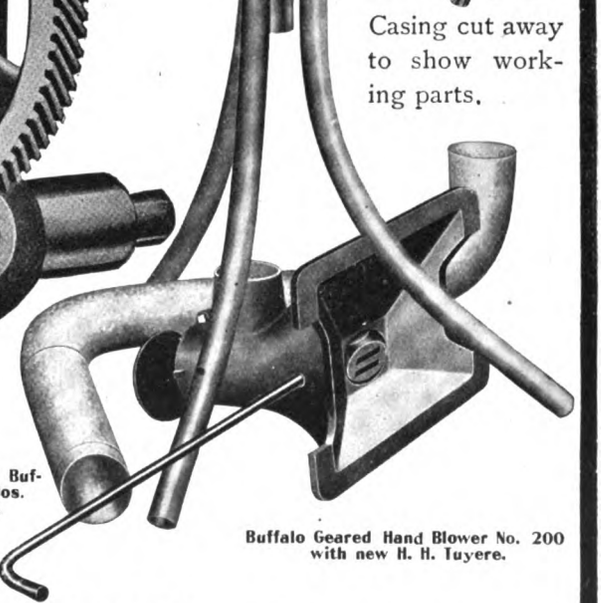
Buffalo Direct Drive Blower No. 306 with new H. H. Tuyere.



Gearing used on Buffalo Blowers Nos. 200 and 306.



Casing cut away to show working parts.



Buffalo Geared Hand Blower No. 200 with new H. H. Tuyere.

TELLING POINTS OF BUFFALO BLOWERS NOS. 200 and 306.

Gears—Heavy, with large, strong, machine cut teeth, cut spur and helical variety which reduces friction and increases efficiency.

Bearings—Bored from solid castings and reamed to gauge, ensuring perfect alignment and easy, silent running.

Oiling—Gears constantly run in oil, keeping the working parts perfectly lubricated.

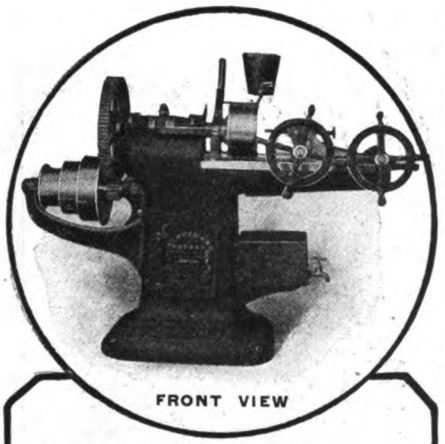
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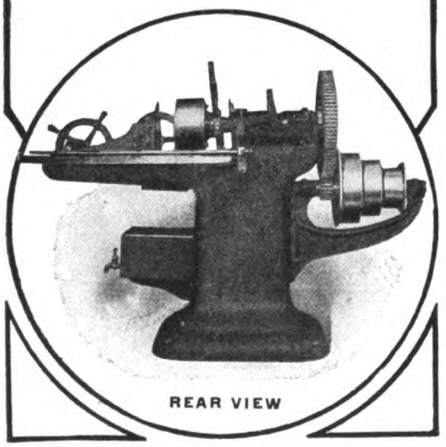
FRONT VIEW

MERRIMAN STANDARD BOLT CUTTERS

Have more special features than any other machine of its kind. Among these great characteristics are: 1. Simplicity of the head; 2. Durability of all parts; 3. Square bearing of dies in ring; 4. Solidity of dies like solid die; 5. Consequent uniformity of product; 6. Effectiveness of operation, very simple in construction. Get our descriptive circulars and complete catalogue of bolt and nut machinery. Free to you. Write today.

The H. B. Brown Co.

EAST HAMPTON, CONN.



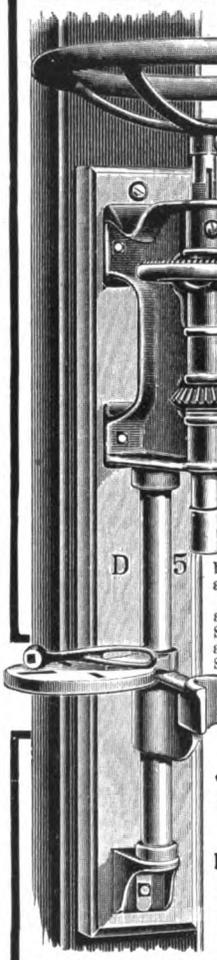
REAR VIEW

Little Giant.

A SIGN OF

Strength and Quality

The "Little Giant" Drill Press



Is a strong, serviceable, compact and thoroughly well made machine and like all other "Little Giant" machines, is **Fully Guaranteed to give perfect satisfaction**

GENERAL DIMENSIONS

Drills to one inch diameter hole. Drills to center of 14-inch circle. Swinging Table (either side). Easily adjusted to height.

Spindle is made of steel and has TOOL STEEL SET SCREW hardened and tempered.

Spindles are made to receive ½ inch or ⅝ Shanked Twist Drills.

Leading Dealers Everywhere carry "Little Giant" Machines.

Write for our complete Catalogue—Free.

A Complete line of **Drills, Vises, Bolt-headers, Swage Blocks and Mandrels** Fully Illustrated and Described.

Send name and address today for Catalogue.

B. B. NOYES & CO.

Greenfield, Mass., U. S. A.



STEEL WRENCHES

Drop-Forged, Semi-Finished

Take nuts for $\frac{1}{16}$ to ¼ inch bolts. Full set of 5 wrenches by express, $1.50. Sample ¼ x $\frac{5}{16}$ by mail 25c. Write for catalogue containing useful information.

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"The Australasian Coachbuilder & Wheelwright."

A Monthly Illustrated Technical Journal circulating amongst Coachbuilders, Wheelwrights and Blacksmiths throughout the Commonwealth of Australia, New Zealand and South Africa.

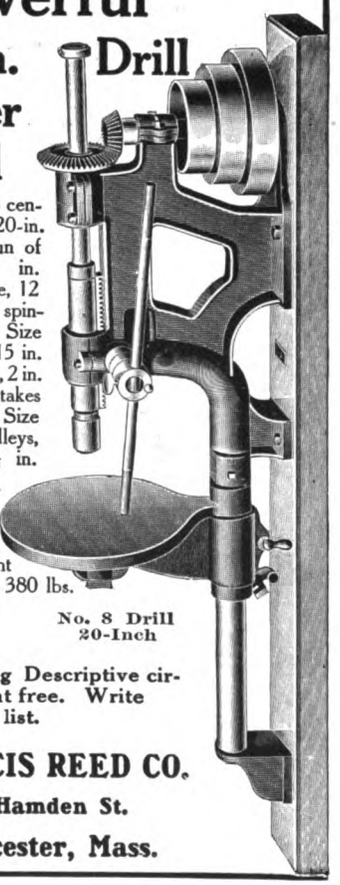
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Powerful 20 in. Drill Lever Feed



Will drill to centre of a 20-in. circle. Run of spindle, 8 in. Run of table, 12 in. Size of spindle, 1½ in. Size of table, 15 in. Size of post, 2 in. Drill socket takes 41-64-in. Size of cone pulleys, 6¾, 8½, 10½ in. Tight and loose pulleys, 8 x 3 in. Total weight of machine, 380 lbs.

No. 8 Drill 20-Inch

Interesting Descriptive circulars sent free. Write for price list.

FRANCIS REED CO.

43 Hamden St.

Worcester, Mass.



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TRENTON

It's the Best Anvil Made.

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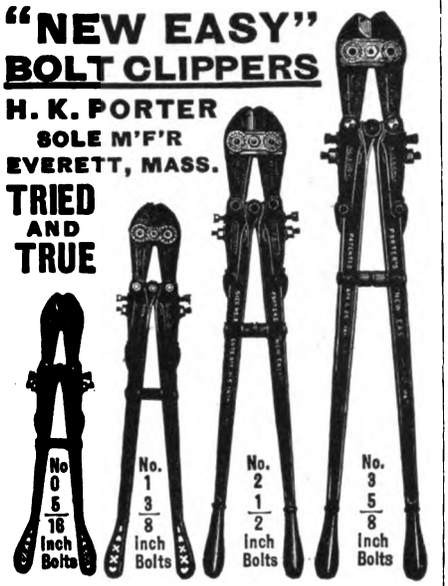
Do you mind seeing a few extra dollars coming your way?

SEE PAGE 4

"NEW EASY" BOLT CLIPPERS

H. K. PORTER
SOLE M'F'R
EVERETT, MASS.

TRIED AND TRUE



REFUSE CHINESE IMITATIONS OF THESE TOOLS; THEY ARE INFERIOR.

THE "BUSH" Low-down Handy Wagon

WITH 4-IN. TIRE STEEL WHEELS

Our wagons are well ironed throughout—wheels made with round staggered spokes.



We make any size wheels to fit any skein.

We manufacture a complete line of metal wheels for corn planters, cultivators, plows, etc.

WRITE TO C. BUSH, QUINCY, ILL.
(MENTION THIS PAPER.)

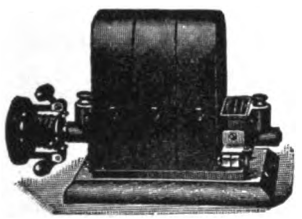


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For Plow Work, Wagon Work, Heavy Work, Any Work.

"We have been using your Boss trip hammer for over a year and will say that to do without it would end the business for us as we have a great deal of plow work and to go back to the old method of drawing out a share would discourage me so much that I would quit the business. Any man having power should by all means have a Boss hammer." H. J. DUBBS & SON, Ransom, Kas.

G. E. DAVIS, Mgr., DUBUQUE, IOWA.



HENRICKS MAGNETO

Fires your gas or gasoline engine without the aid of batteries.

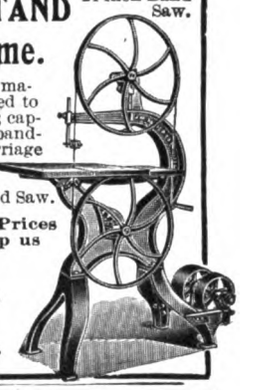
It is better and more durable than any Dynamo. Its Governor regulates the speed regardless of speed of Fly Wheel. Its Governor adjusts to imperfect Fly Wheels. Its Governor insures a constant and uniform spark. The spark does not burn the contacts of the engine. All strains are removed from the bearings of Magneto. FULLY GUARANTEED. AGENTS WANTED.

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BUILT TO STAND the Test of Time.

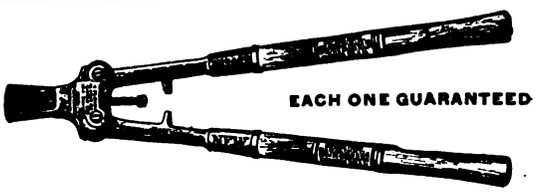
24-inch Band Saw.



A well-made, accurate machine; especially adapted to run by gasoline engine; capable of all kinds of band-sawing, particularly carriage repair work. These are a few of the fine points of Marston's Band Saw.

We will gladly send Prices and Circulars. Drop us a Card today.

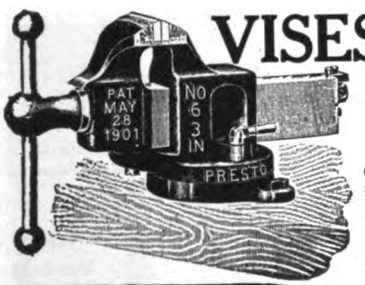
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222 Ruggles St.,
Boston, Mass., U.S.A.



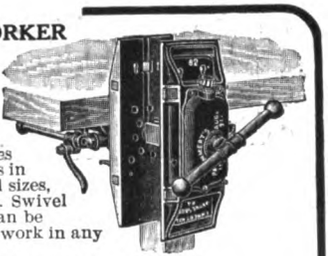
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EACH ONE GUARANTEED

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VISES FOR THE IRON AND WOOD WORKER

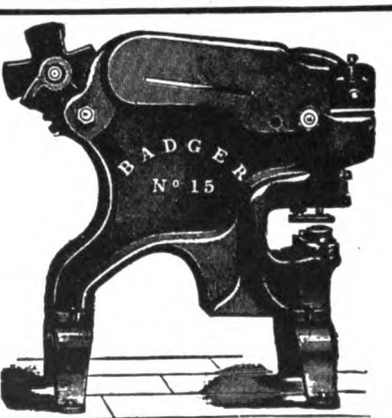


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Weight 800 lbs.

Mr. Blacksmith:

Here is a Punch and Shear that will punch and shear just as we say with

ONE MAN ON LEVER.

Punch 5/8 in. hole in 1/2 in. Iron
Shear 4 x 1/2 in. Flat Iron
" 7 x 1/4 in. Band Iron
" 1 in. Round Iron.

Write for Prices, Etc.

Rock River Machine Co.,
JANESVILLE, WIS. U. S. A.

HAND FORGED BUTCHER KNIVES



A GOOD SIDE-LINE

Hundreds of blacksmiths are making large profits by selling these blades. Each one is fully warranted. Made of Sanderson Steel.

Round or riveted. All sizes from 5 to 8 inch.
Handles ready to put on, 1c each.

$ .15 EACH
1.50 DOZ.

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Pocket Knife Handles in variety, 10 cents each. Send for sample.

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Potters Spring Brake Blocks

For Vehicles of all kinds with STEEL OR RUBBER TIRE.
Have a record of excellency for seventeen years.

The MORGAN POTTER CO.

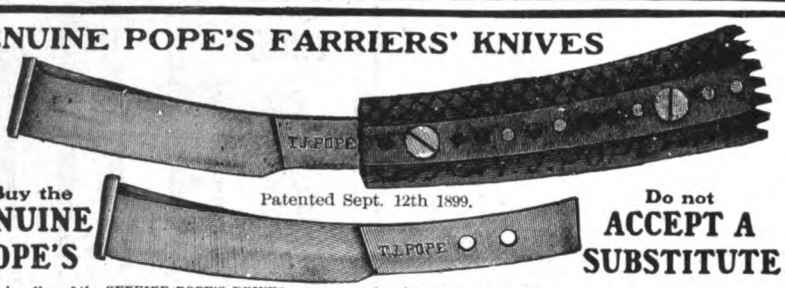
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SEND FOR CATALOGUE.

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GENUINE POPE'S FARRIERS' KNIVES



Buy the **GENUINE POPE'S**

Patented Sept. 12th 1899.

Do not **ACCEPT A SUBSTITUTE**

The handles of the GENUINE POPE'S KNIVES are now made with the notched end shown above. All such bear the maker's name, T. J. POPE. All genuine Blades are stamped PAT. SEPT. 12, 1899.

SOLE AGENTS, For Sale by Dealers in Blacksmiths' Supplies Everywhere.

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San Francisco Office, 318 Market Street, HUGHSON & MERTON, Inc.

"CHICAGO" EMERY WHEELS CUT QUICK

A wheel that will do the work in one-fourth to one-half less time is by far the cheapest in the long run. A wheel that will save only one hour per day during your busy season would pay for itself in full.

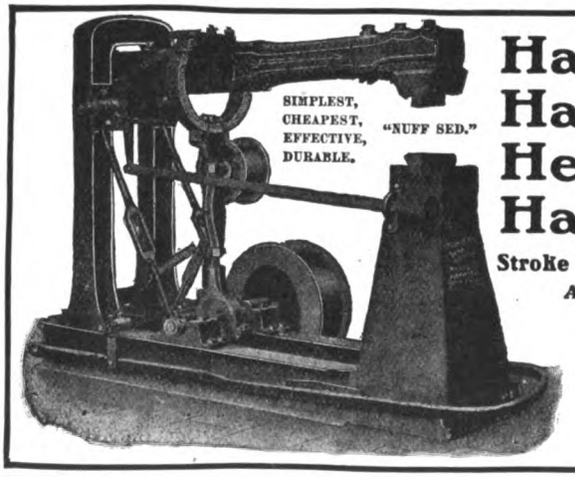




NATIONAL SAFETY SHORT-TURNING FIFTH WHEELS

have been on the market for over **TEN YEARS** and used by good Carriage Builders everywhere. Ask your dealer for them. If he can't supply you, **write for catalogue** showing all our different styles.

National Safety Fifth Wheel Co.,
LANCASTER, PA.



Hathorn's Hard-hitting Helve Hammer.

Stroke adjustable while running.

Ask your Dealer or write to

HATHORN FOUNDRY & MACHINE CO.
1206 N. 71st Ave.
CHICAGO, ILL.
Mont Clare Station.

"CHICAGO" WHEELS SAVE TIME

They're made of stuff that cuts

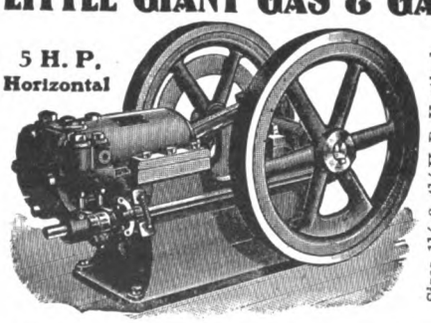
Emery Wheels, Glue, Emery, Polishing Wheels, Grinding Machinery

136 Page Catalogue for the Asking

Chicago Wheel & Mfg. Co.
42 W. RANDOLPH ST.
CHICAGO, U. S. A.

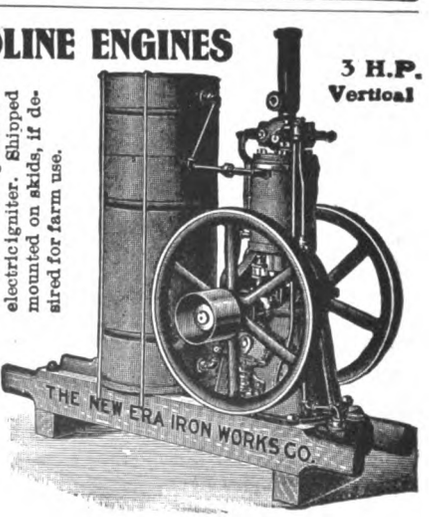
LITTLE GIANT GAS & GASOLINE ENGINES

5 H. P. Horizontal



Sizes, 1½, 3, 4½ H. P. Vertical, 5 to 25 H. P. Horizontal. Either tube igniter or electric igniter. Shipped mounted on skids, if desired for farm use.

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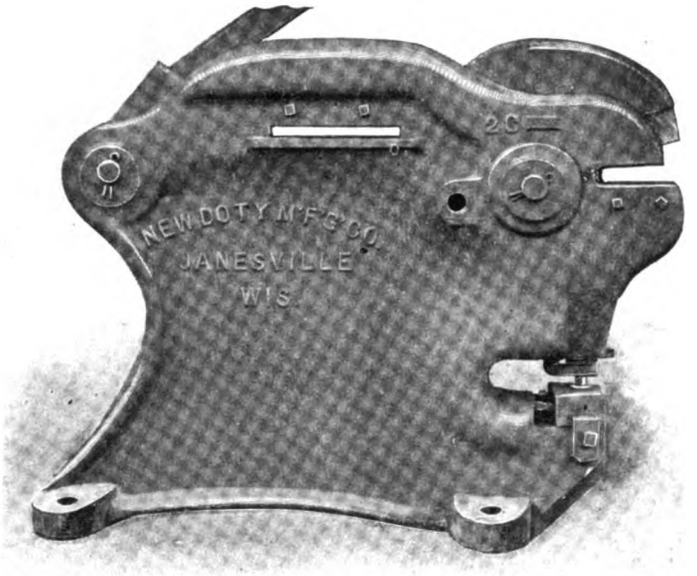


Also equipped with pumping attachments. Write for booklet describing full line New Era Gas Engines from 8 to 100 H. P. Special inducements to dealers as agents.

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NEW DOTY PUNCHES and SHEARS

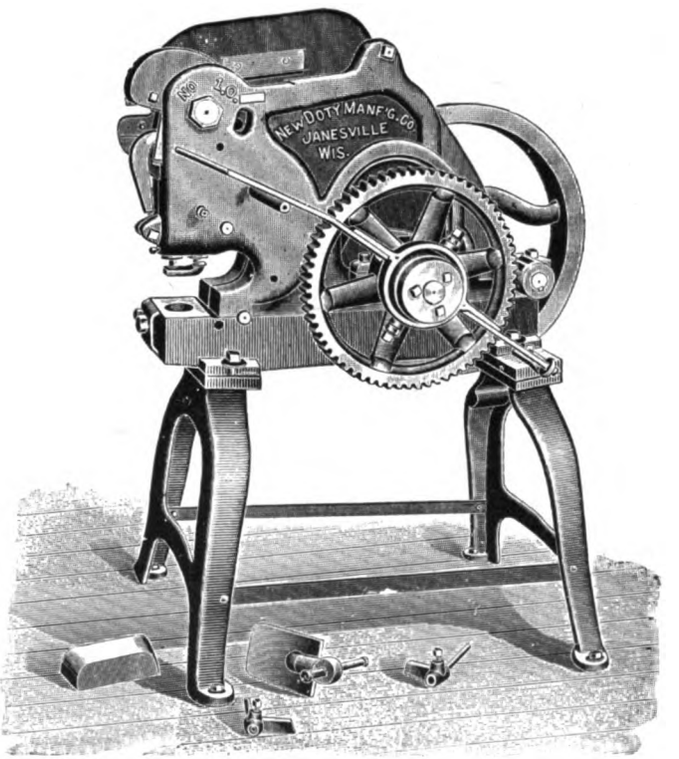


NO. 2 C

A Complete Line of HAND and POWER PUNCHES and SHEARS Combined

The two machines here illustrated are especially adapted for the use of Blacksmiths. They are very strong and powerful and are the most convenient tools of the kind on the market

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YOU WILL NEVER FAIL

To Make a Strong, Clean Weld If You Use Perfection Welding Compound.

We invite you to give our Compound a thorough test, and will ship any amount to any address for that purpose. If it does not prove just as represented we pay all expenses.



Perfection Welding Compound will do the trick quickly and neatly. It makes a stronger weld than any other compound manufactured, as proven by the tests it has undergone. Send for free sample.

PRICE CONSISTENT WITH QUALITY.

PERFECTION WELDING COMPOUND CO., SCRANTON, PA.

THE STERLING POWER HACK SAW

COMBINES SYMMETRY OF CONSTRUCTION WITH GREATER POWER "IT'S STERLING VALUE."

GEAR DRIVEN. TIGHT AND LOOSE PULLEY.



GRAVITY FEED. AUTOMATIC SHUT OFF.

ITS IMPROVEMENTS MAKE IT A GREAT STEP IN ADVANCE OF ANY OTHER POWER HACK SAW. BE CONVINCED - GET OUR CIRCULAR.

DIAMOND SAW & STAMPING WORKS
BUFFALO, N.Y., U.S.A.

Morris, Minn., Oct. 18, 1906.

Buffalo Forge Co.,
Buffalo, N. Y.

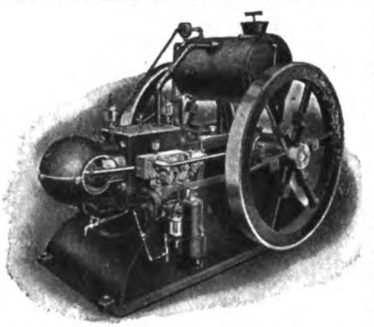
Gentlemen:—

Let me say for your Buffalo Blower No. 200 that with fifty per cent less energy I can produce one hundred per cent more blast than with any other blower made. And you can well afford to give the five year guarantee you do, as there is nothing to wear out.

Your 1907 Drills I consider far ahead of anything in its line as is also your Buffalo Armor-Plate Punch, Shear and Cutter.

Yours very truly,
J. G. HOLMSTROM.

LIGHTNING GASOLINE ENGINES



Steam Cooled
Double Piston
No Foundation

Send for Catalogue Showing Superior Points, and get Prices

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INVESTIGATE THE

Hercules Hydraulic

Before You Buy a Tire Setter



National Machine Co.

KEOKUK, IA.

THE SCIENTIFIC HYDRAULIC TIRE SETTER



IS WHAT YOU WANT.

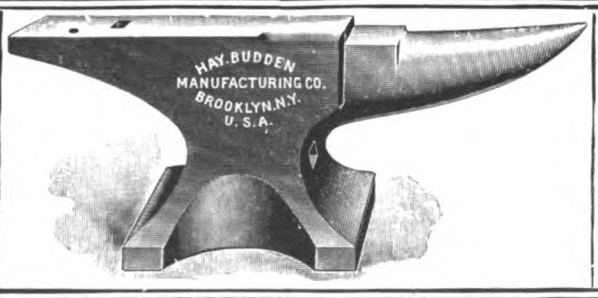
WRITE TO
STANDARD TIRE SETTER CO.,
KEOKUK, IOWA.

HAY-BUDDEN SOLID WROUGHT ANVILS

The Gold Medal Anvil
Highest Award
OMAHA, 1898. PAN-AMERICAN, 1901

Every Genuine "Hay-Budden" Anvil is made of the best *American Wrought Iron* and faced with best *Crucible Cast Steel.* Every genuine "Hay-Budden" Anvil is made by the latest improved methods.

WEIGHTS FROM 10 TO 800 LBS.



OVER 100,000 IN USE

WARRANTED

Experience has proved their worth and demonstrated that "HAY-BUDDEN" Anvils are Superior in Quality, Form and Finish to any on the Market.

HAY-BUDDEN MFG. CO., BROOKLYN, N. Y.

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VOLUME 6

THE AMERICAN BLACKSMITH

NUMBER 4

A Practical Journal of Blacksmithing and Wagonmaking

BUFFALO
N.Y. U.S.A.

JANUARY, 1907

$1.00 A YEAR
10c A COPY

BUFFALO NO. 660 PORTABLE DOWN DRAFT FORGE

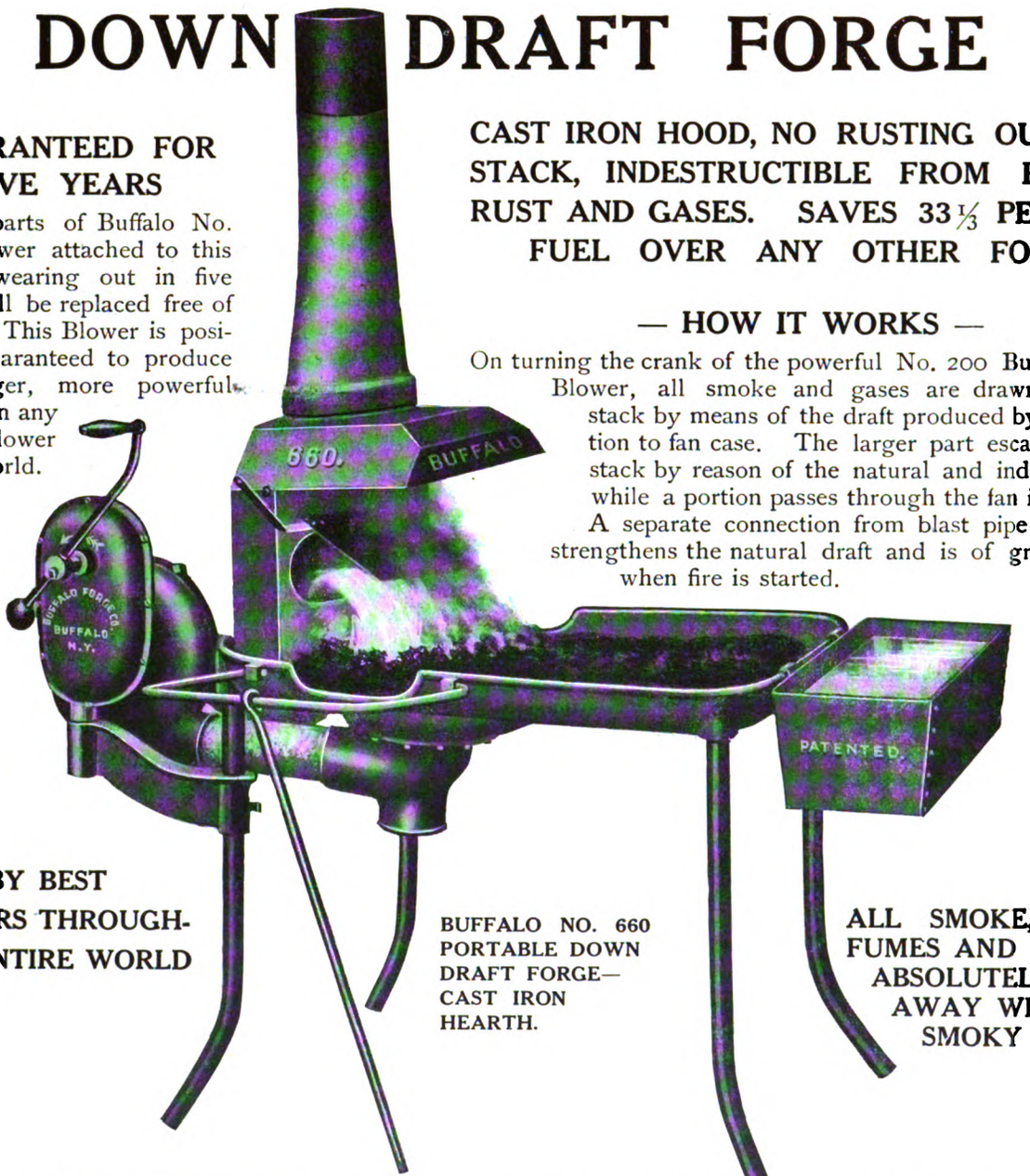
GUARANTEED FOR FIVE YEARS

Any parts of Buffalo No. 200 Blower attached to this Forge, wearing out in five years, will be replaced free of charge. This Blower is positively guaranteed to produce a stronger, more powerful blast than any other blower in the world.

CAST IRON HOOD, NO RUSTING OUT, TILE STACK, INDESTRUCTIBLE FROM HEAT, RUST AND GASES. SAVES 33⅓ PER CENT FUEL OVER ANY OTHER FORGE

— HOW IT WORKS —

On turning the crank of the powerful No. 200 Buffalo Hand Blower, all smoke and gases are drawn into the stack by means of the draft produced by a connection to fan case. The larger part escapes up the stack by reason of the natural and induced draft, while a portion passes through the fan into tuyere. A separate connection from blast pipe into stack strengthens the natural draft and is of great service when fire is started.



SOLD BY BEST DEALERS THROUGHOUT ENTIRE WORLD

BUFFALO NO. 660 PORTABLE DOWN DRAFT FORGE— CAST IRON HEARTH.

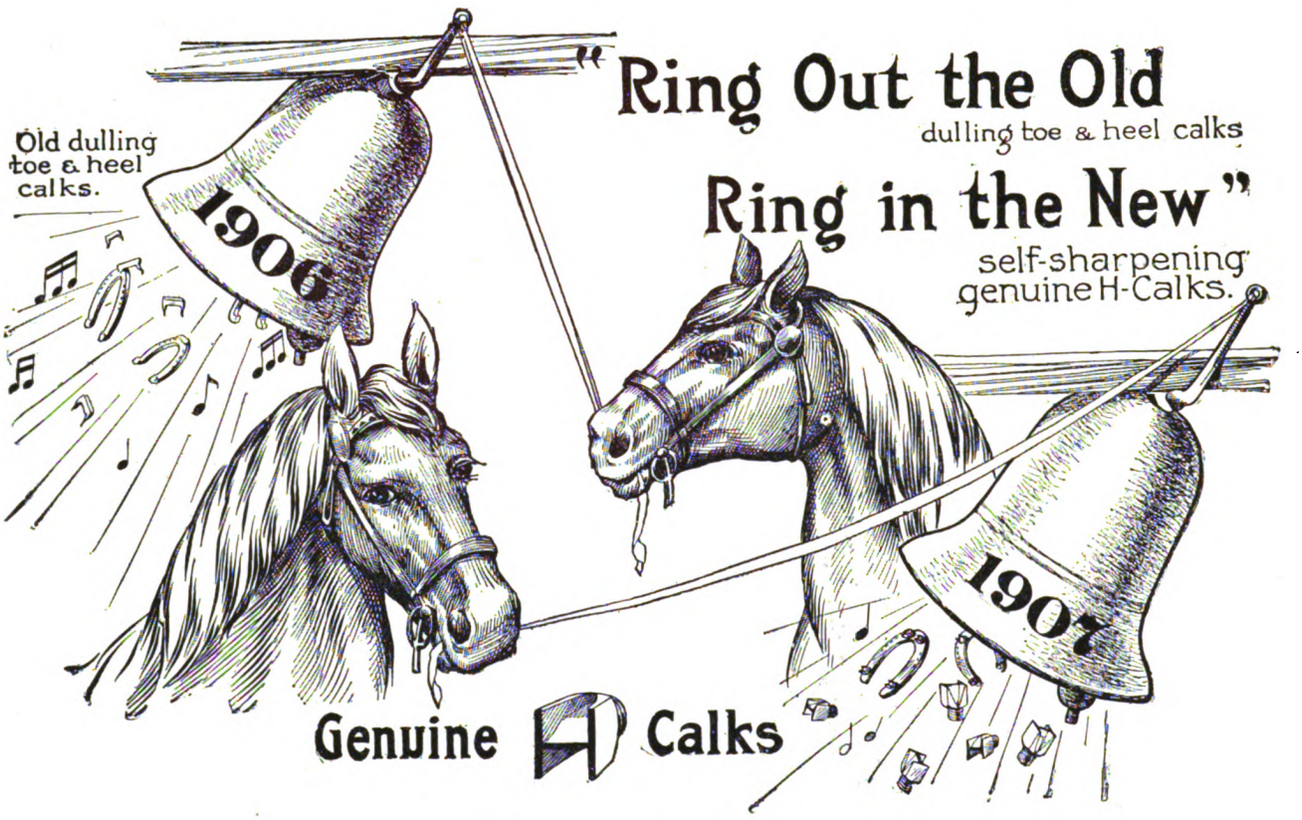
ALL SMOKE, GASES, FUMES AND CINDERS ABSOLUTELY DONE AWAY WITH. NO SMOKY SHOPS.

BUFFALO FORGE COMPANY

BUFFALO, N. Y., U. S. A.

THE CANADIAN BUFFALO FORGE COMPANY, LTD., MONTREAL, CANADA

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If horses had their say this New Year like the *blacksmith*, or the man "that knows," they'd all kick most seriously to the old John Smith way of *welding soft*, *dulling*, iron toe and heel calks to their shoes——because all horses *want* and "ring in" *the tried and true* self-sharpening



When New

GENUINE

H-CALKS



When Half Worn

Genuine H-Calks are *solid steel*— secret processed——not soft, dull, wearing iron. They are *inserted* into the horse's shoes — they stay sharp and will wear down to the thread, giving the same *effective* calking service when *half worn* as when *new*. See the above small calk pictures entitled, "When New"——"When Half Worn." Will a pointed calk do this? No. Genuine H-Calks will *wear longer*, too, and give the horse more *winter comfort and actual protection* from dangerous slipping accidents than any other calk made. Genuine H-Calks have *no evil* protruding points — they can't injure the horse. Modern Blacksmiths all know that genuine H-Calks are *increasing* and *building up* their business—because they get the *full benefit* of all sales, according to our bond with the N. P. A. This H-shaped calking device is as *far in advance* of the old bothersome toe and heel calks as the match is superior to the antique flint and steel. "Ring in" and *use* the new genuine H- Calk—it will prove a profitable "New Year" resolution for future business.

Will send you samples and interesting literature if you'll ask us.

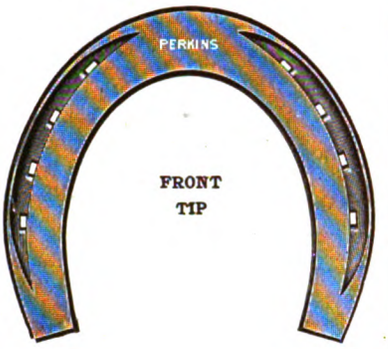
H-CALK CO., (Inc.), 16 Beaver St., NEW YORK.

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HIND
LONG HEEL.

Look for this Trade Mark ★ The Star brand beats all others



FRONT
TIP



FRONT
LIGHT.



FRONT
TOE WEIGHT.

★PERKINS★
HORSE SHOES
AND
TOE CALKS
The **SUPERIOR** Kind

Have more points of superiority than any other make. An up-to-date shoe for up-to-date Blacksmiths.



HIND
SIDE WEIGHT.

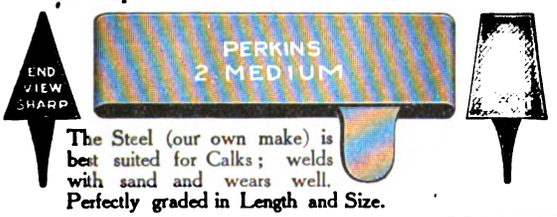
Perkins Shoes have given satisfaction wherever used. Our line is complete and every shoe guaranteed. Made in all styles and sizes. Send for sample. New Pattern Front Extra Light and Light. Free for the asking. We will gladly send

COMPLETE CATALOGUE AND SAMPLES FREE.

WRITE TODAY.

PERKINS

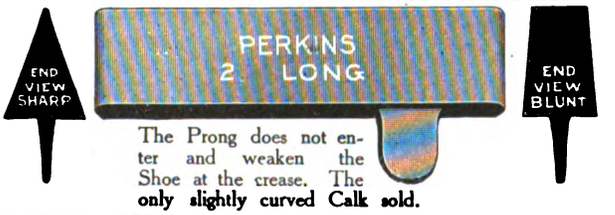
Made in Medium and Long, both blunt and sharp. Packed in 25 lb. boxes.



The Steel (our own make) is best suited for Calks; welds with sand and wears well. Perfectly graded in Length and Size.

TOE CALKS

Chisel Pointed Prong. These cuts show exact size of No. 2. SAMPLES SENT FREE.



The Prong does not enter and weaken the Shoe at the crease. The only slightly curved Calk sold.

MANUFACTURED BY

RHODE ISLAND PERKINS HORSE SHOE COMPANY

PROVIDENCE, RHODE ISLAND.

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Some Day You Will Write Us.

SOME day you will write us for our booklet "Carriage Maker and Blacksmith Tools." Don't say you won't, for that would be a slander on your business judgment.

"But how do you know?" you ask. Because it will cost you only a penny for a post card and it may mean many dollars to you. Now, will you spend the penny and save the dollars, or will you save the penny and lose the dollars? You'll spend the penny, of course. That's how we know you'll write us some day.

When you are thinking of how to increase your profits, when you're worrying over how to cut down expenses, when you're fretting about your wasted time and materials—that's when you should spend the penny for the post card. Then do it—right then. Don't be "penny-wise, pound-foolish." Don't save the penny and lose the opportunity.

We mention only a few of our machines here. Send for booklet for full information.

BAND SAWS—neat, new designs, substantial construction, table adjustable to different angles up to 45° for bevel sawing; used for cutting cloth, ice, cardboard, sheet metal, brass, etc.; several sizes.

DRILLS—Post, Swing and Bench Drills, hand and power. Every wanted size. New, simple, efficient and positive; for shops and small factories, smith shops, repair shops, iron furnaces, carriage and wagon shops.

NEW TAPER HUB BORING MACHINES—centre the hub instantly and accurately; instantly adjusted for taper or straight bore.

PORTABLE FORGES—in all sizes and prices—light-running, convenient, durable and economical—real money savers.

We want to prove the merits of these and our other machines. *Ask us for our booklet "Carriage Maker and Blacksmith Tools."* It's free.

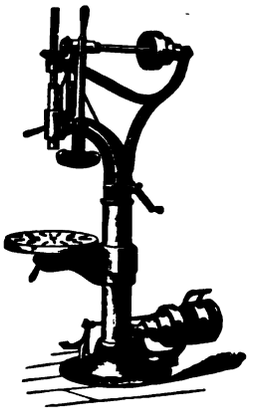


Fig. 850.
SILVER'S BASE DRILL.

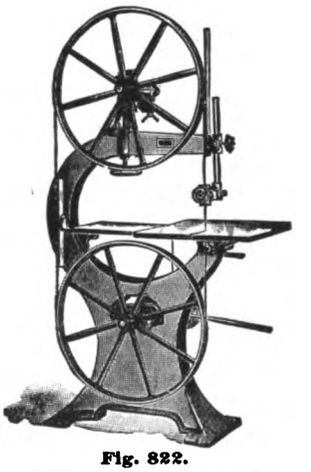


Fig. 822.
SILVER'S POWER BAND SAW.

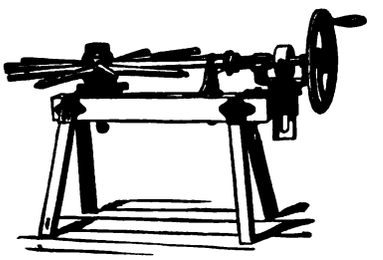


Fig. 718.
SPOKE TENON MACHINE.

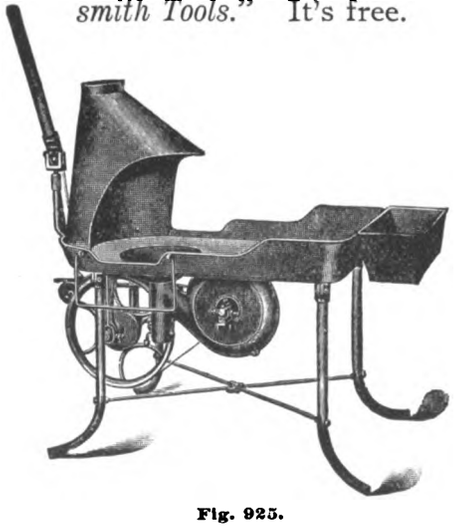


Fig. 925.
SILVER'S PORTABLE FORGE.

MANUFACTURED BY

The Silver Mfg. Co.

365 BROADWAY

Salem, - Ohio.

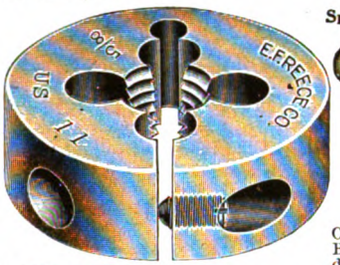
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A NEW YEAR BRINGING TO THE 50,000 READERS OF THE AMERICAN BLACKSMITH

A NEW OPPORTUNITY

To provide themselves with the Celebrated "REECE" and "HERCULES" SCREW PLATES and other Screw Cutting Tools at the *MOST FAVORABLE Prices* consistent with the HIGHEST QUALITY.

READ! *Announcement for 1907* READ!



"REECE" Patent Adjustable Die.

Spring tempered at back.



Knurled Handles give firm hold.

FRONT VIEW OF GUIDE STOCK.

REECE ADJUSTABLE GUIDE.
Don't be satisfied with Solid Guides. This one is way ahead of them.



One adjusting screw only is needed. By simply turning it in or out the die is easily and quickly adjusted to cut larger or smaller.

BACK VIEW OF GUIDE STOCK.
The Adjustable Guide Stock allows for variation in size of common iron.



"HERCULES" ADJUSTABLE TAP WRENCH.

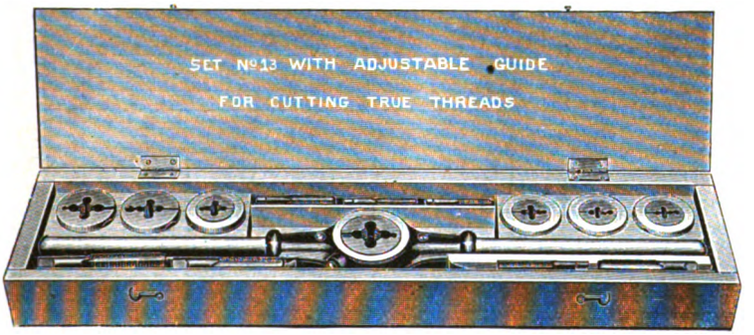
MADE IN SEVEN SIZES, holding taps from $\frac{1}{16}$ in. to 1½ in. The jaws in these wrenches are of Best Tool Steel, carefully hardened and tempered. Handles are nicely knurled and polished. Centers have mottled finish.

PLATE TAP.



Made of Best Tool Steel. We make easy cutting and long wearing taps.

EXCEPTIONAL OFFER on Three Standard Assortments



SEND FOR FREE ILLUSTRATED CATALOG, No. 6, of 84 Pages.

OFFER NO. 1.

No. 12 Reece Screw Plate with patent adjustable guide stock and 5 sizes taps and dies, ¼, ⅜, ½, ⅝ and ¾ ins. complete in case, **Special Net Price,** ***$7.87***

OR

No. 122 Reece Screw Plate, same as No. 12 set, with Hercules Adjustable Tap Wrench included (see illustration of tap wrench above), **Special Net Price,** ***$8.72***

OFFER NO. 2.

No. 13 Reece Screw Plate with patent adjustable guide stock and 7 sizes of taps and dies, ¼, $\frac{5}{16}$, ⅜, $\frac{7}{16}$, ½, ⅝, ¾ ins., complete in case, **Special Net Price,** ***$9.00***

OR

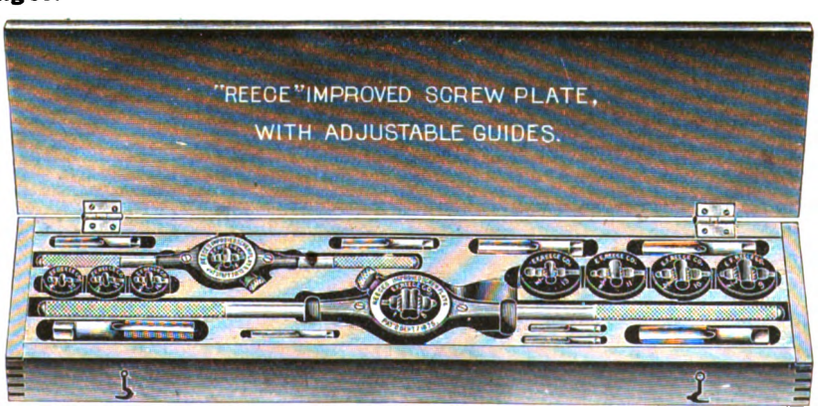
No. 133 Reece Screw Plate (same as No. 13 set) with addition of a Hercules Tap Wrench, **Special Net Price,** ***$9.85***

OFFER NO. 3.

The No. TWENTY Reece Improved Screw Plate with 2 Adjustable Guide Stocks 14 in. and 27½ in. long (see picture opposite), cutting ¼, $\frac{5}{16}$, ⅜, $\frac{7}{16}$, ½, $\frac{9}{16}$, ⅝, ¾, $\frac{7}{8}$ and 1 ins., including 9 sizes of Taps and Dies, all complete in handsome case, **Special Net Price,** ***$14.62***

OR

The new No. 200 assortment same as No. 20, with 2 Hercules adjustable tap wrenches included **Special Net Price,** ***$16.87***



We request you to place your orders for these screw plates with your dealer. If for any reason he cannot fill your orders, THEN write to us.

THE E. F. REECE CO., Greenfield, Mass.

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Buffalo 200 Blower

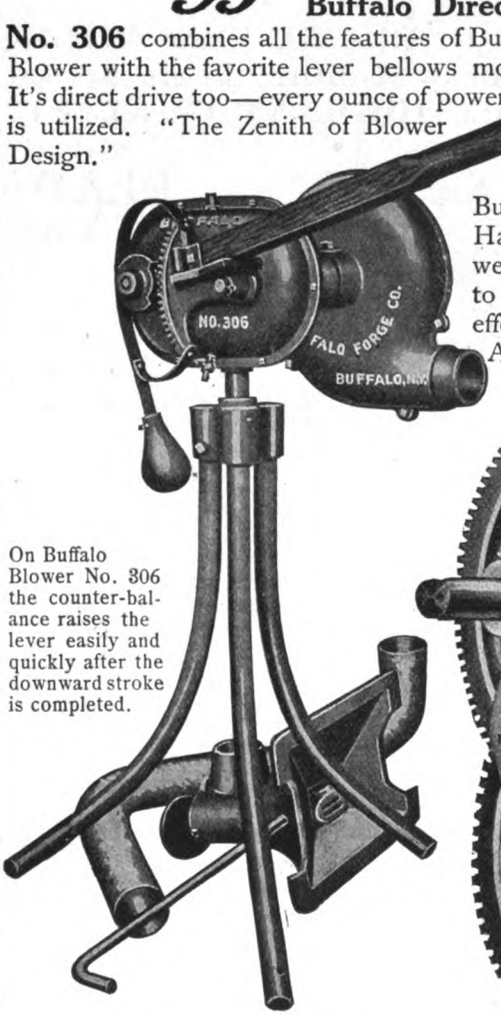
Buffalo Direct Drive Blower

No. 306 combines all the features of Buffalo No. 200 Blower with the favorite lever bellows motion. It's direct drive too—every ounce of power is utilized. "The Zenith of Blower Design."

GUARANTEED FOR FIVE YEARS

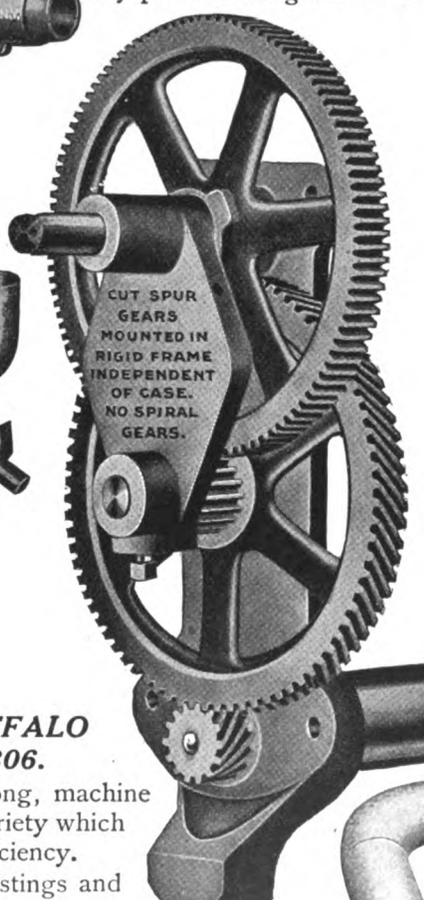
GUARANTEED FOR FIVE YEARS

Buffalo Nos. 200 and 306 Geared Hand Blowers are guaranteed to outwear any others on the market and to produce a stronger blast with less effort than any other blower built. Any parts wearing out in five years will be replaced free of charge.

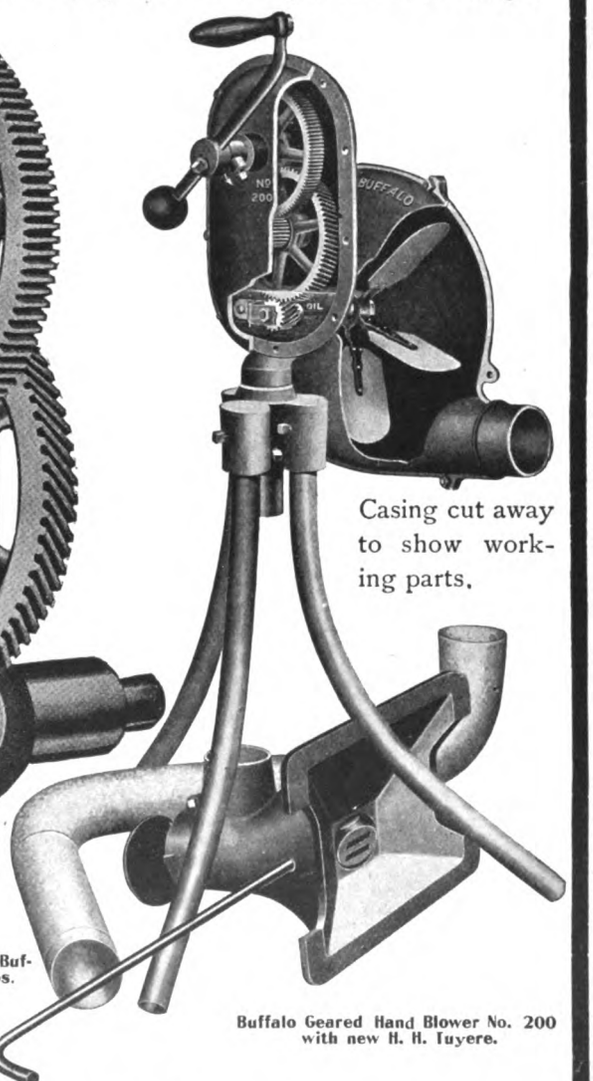


On Buffalo Blower No. 306 the counter-balance raises the lever easily and quickly after the downward stroke is completed.

Buffalo Direct Drive Blower No. 306 with new H. H. Tuyere.



Gearing used on Buffalo Blowers Nos. 200 and 306.



Casing cut away to show working parts.

Buffalo Geared Hand Blower No. 200 with new H. H. Tuyere.

TELLING POINTS OF BUFFALO BLOWERS NOS. 200 and 306.

Gears—Heavy, with large, strong, machine cut teeth, cut spur and helical variety which reduces friction and increases efficiency.

Bearings—Bored from solid castings and reamed to gauge, ensuring perfect alignment and easy, silent running.

Oiling—Gears constantly run in oil, keeping the working parts perfectly lubricated.

New Illustrated Folder sent on request.

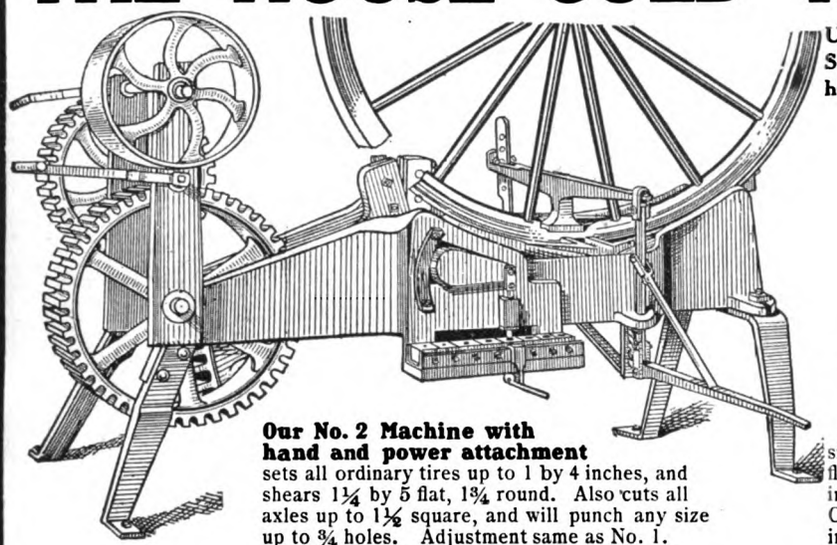
Sold by Best Dealers Throughout Entire World.

Buffalo Forge Company
Buffalo, N.Y.

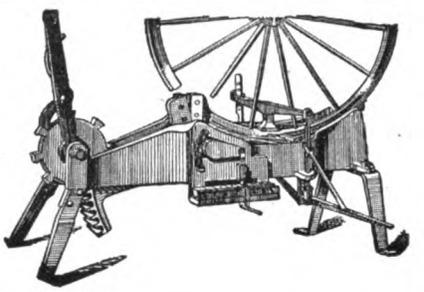
Canadian Friends Buy of The Canadian Buffalo Forge Co., Ltd., Montreal, and Save Duty.

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THE HOUSE COLD TIRE SETTER



Uncle Sam has adopted the House Cold Tire Setter. He has tried others, but you can't fool him and keep him fooled. He will have the best.



Our No. 2 Machine with hand and power attachment sets all ordinary tires up to 1 by 4 inches, and shears 1¼ by 5 flat, 1¾ round. Also cuts all axles up to 1½ square, and will punch any size up to ¾ holes. Adjustment same as No. 1.

This is a cut of our No. 1 Machine, which sets all size tires up to 2 by ¾ inches and shears ⅝ by 3 flat iron and ⅞ round, and punches holes up to ½ inch, and does it almost as fast as you can count. Can be changed from one size hole to the other in two seconds.

A Happy New Year to all, and congratulations to our customers on their wise purchase, for it has brought them profit so that they have paid us promptly, which makes us happy. Of course it does to have both the money and thousands of pleased customers, who are located in nearly every county in every State in the Union and we have hundreds abroad. They are at work in nine different nations, and we have factories in two and starting up in two others. Can't you help us say "Hurrah" for our American progress? We have known of one customer who set 117 tires in a day, single handed, and cleared $55. We have hundreds that have made from $2,000 to $6,000 on their machines. You cannot go wrong if you buy a House. So don't be deceived into buying anything else. The House is not only the best tire setter made, but we give the best punch and shear in the world with it free. And with all that, ours sell for less money than the other cold tire setters.

OFFICE AND FACTORY

HOUSE COLD TIRE SETTER CO. 216-220 So. Third St., St. Louis, Mo., U. S. A.
No. 40 Church St., Toronto, Ont., Can.

HE IS A WISE SHOER

WHO MAKES A SPECIALTY OF THE PAD END OF HIS BUSINESS

There is plenty of reason for believing that as soon as teaming concerns, express companies, liveries, and like users of horses become fully aware of the value of pads in giving increased service per horse, in avoiding lay-ups due to hoof troubles, and in reducing veterinary bills, 99 per cent of them will become pad enthusiasts.

And the shoer who is a "pad specialist" will add a nice monthly sum to his bank account.

BUT (and this is mightily important) he is not a Wise Shoer who attempts business suicide (by the use of poor pads) just as this big, profitable business is knocking at his front door.

In other words, there is not much money in being an expert at putting on unsatisfactory pads.

MORGAN & WRIGHT pads have gained the reputation among shoers of being "pads that help the pad business."

Shoers who begin using them almost invariably find it to their advantage to use them exclusively.

Such shoers are laying their foundation lor a big pad business by giving their customers pads that encourage pad using.

They are "cinching" future business by the use of MORGAN & WRIGHT pads.

Be a wise shoer.

Be a good pad specialist.

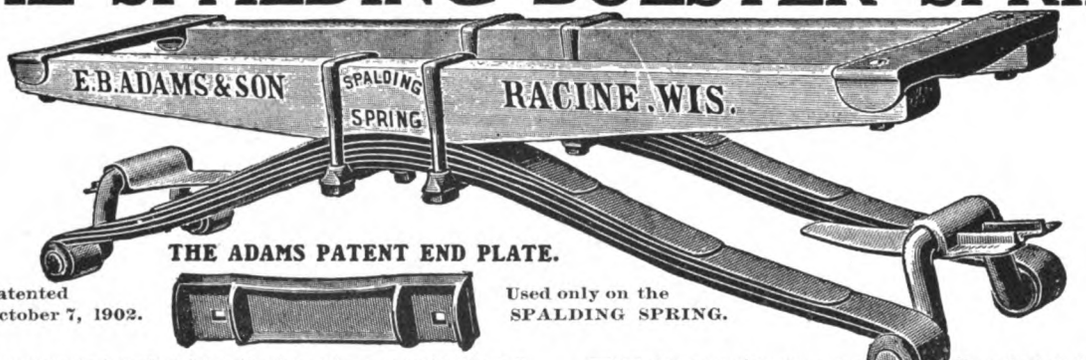
MORGAN & WRIGHT PADS ARE GOOD PADS

A pad for every purpose—15 in all. Easy to fit. Run larger than other brands. Any jobber can supply you.

MORGAN & WRIGHT, - DETROIT

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THE SPALDING BOLSTER SPRING



THE ADAMS PATENT END PLATE.

Patented October 7, 1902.

Used only on the SPALDING SPRING.

ALL legitimate dealers should handle this style as it is the **"only"** Spring on the market **"not"** handled by catalogue houses.

The Adams Patent End Plate is guaranteed **"not"** to bend or break, and will **"not"** cut the Bolster stakes as the old style flat steel plate **"cannot help doing."**

Neither can the Springs get out of position or twist out of shape, but always work perfectly and last much longer than they otherwise would. It also protects the bar ends and keeps them from splitting or checking. In fact, they add at least 50 per cent. to the life and service of a set of Springs.

THE above cut gives you some idea of what this End plate is, but it must be seen and used to be fully appreciated. We also use the best and heaviest solid clip tie on the market, of which we were the originators.

Our Crank Plates are dust and dirt proof, we use the best bars and steel that money can buy, and spare no expense to keep the "Spalding" up to the reputation it has enjoyed for the past sixteen years, of being the "Best Bolster Spring made."

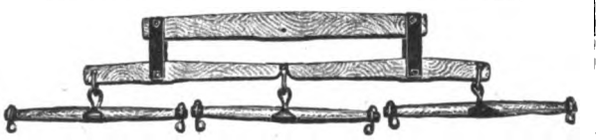
Our goods **"are"** acknowledged superior: they are **"not"** handled by catalogue houses, and our prices are fully as low as others.

EUREKA 3-HORSE EQUALIZERS.



A Perfect 3-Horse Hitch for Pole Use.

ADAMS THREE-HORSE HITCH.



Perfect Equalizer for Plows, Drags, Etc.



THE ADAMS SAFETY NECK YOKE AND CENTER.



EVERY CENTER WARRANTED. Will not let the pole down **It is strong, durable and a good looker. if the tugs unhitch.**

STEEL SHAFT REPAIR ENDS.



How the Shaft TRADE PIONEER C. S. & CO. BRAND MARK. looks when finished.

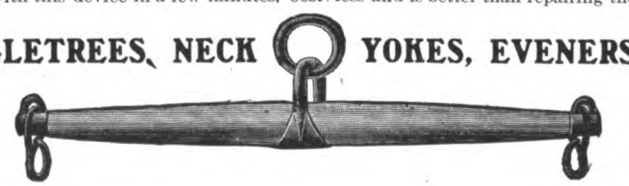
Consists of two thick Steel Tubes, the inner tube having a hickory filler. Anyode can repair a broken shaft with this device in a few minutes. Costs less and is better than repairing the old way.

SPRING BOW REST.



Saves Broken Back Bows.

SINGLETREES, NECK YOKES, EVENERS, ETC.



POLES AND SHAFTS— ALL SIZES.





BOLT CLIPPERS.

HANDIEST AND BEST MADE.

BIG STOCK, RELIABLE GOODS. RIGHT PRICES.

Wagon and Carriage Extras.

Wagon Jacks, Pole Supports, Etc.

Our Catalog Lists Hundreds of Other Articles in Every Day Use.

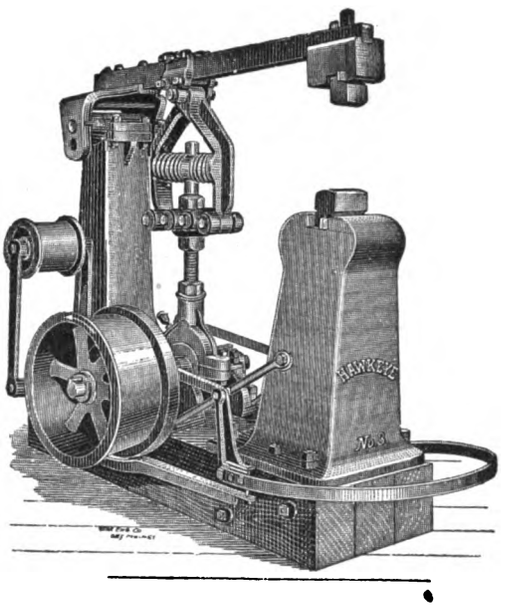
SEND FOR IT AND GET OUR PRIECS.

E. B. ADAMS & SON, Racine, Wis.

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HAWKEYE

Buying a power hammer is purely a matter of business with you. You naturally want to get the best you can for the money. It is on this basis we ask your patronage. We make **power hammers our specialty,** having spent a great deal of time and money to build a hammer that will give our customers the best service for the least money. **When you buy a Hawkeye** remember you profit by our years of experience, which has enabled us to build them right in every particular.



HAWKEYE

You need not consider how you are to pay for a Hawkeye Hammer. **They pay for themselves in from one to three months.** One of our customers writes he made $250 in one season sharpening discs alone. Another writes he does as much work alone, with a Hawkeye Hammer, as he and two helpers, whom he paid $5 per day, did before by hand, and he does it better. We will be pleased to send copies of a number of such letters to any one desiring to buy a power hammer.

HAWKEYE POWER HAMMERS

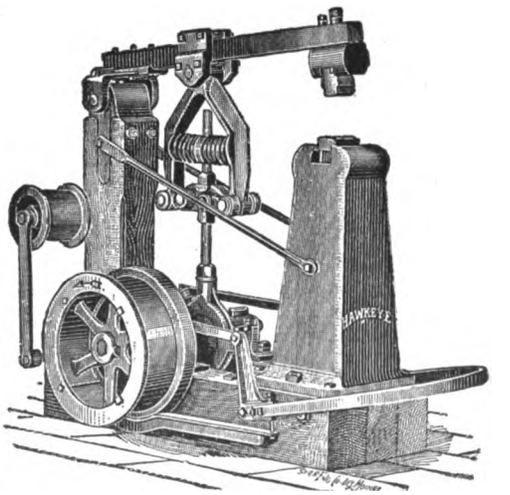
PATENTED { **In the United States, Sept. 29, 1903**
In Canada, Feb. 21, 1904

MADE BY THE

HAWKEYE MANUFACTURING. CO.

CEDAR RAPIDS, IOWA.

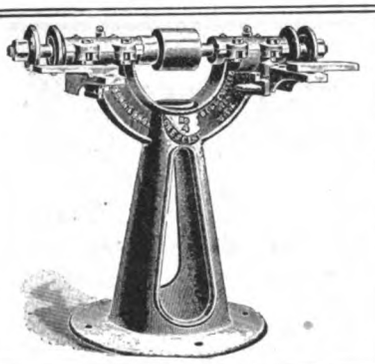
You will never need to turn a job away if you have a Hawkeye Hammer. **No adjustment of stroke is required** to handle work from plow sharpening up to welding 2½ inch round or square steel, **but our hammers have the adjustment just the same,** and it is a mighty handy thing to have for extraordinary work. **Remember,** it costs you nothing extra. **Why not have it? These features alone make our hammers superior to all others.**



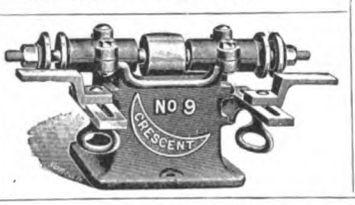
ONE H. P. RUNS EITHER.

Our hammers are built in two sizes to meet the requirements of both large and small shops. We wish to call **special attention to the room the operator has to handle long work,** both from the front and side of the machine. Our No. 3 hammer is especially popular with city blacksmiths and parties having a large range of both light and heavy work to handle. **For prices and full information, write to the Hawkeye Mfg., Co., Cedar Rapids, Iowa.**

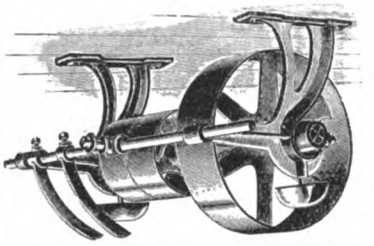
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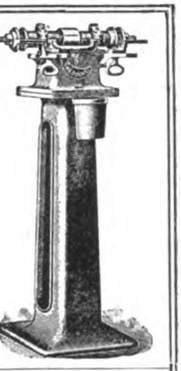


CRESCENT
Grinding Machinery,
Polishing Machinery,
Counter Shafts.



Send for Catalog.

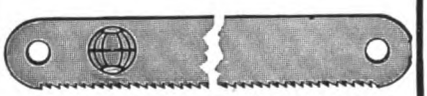




Manufactured by **J. C. BORN & BRO. MCH. WORKS,**
BELLEVILLE, ILL., U. S. A.

Your Hack Saw Troubles

will come to an end if you get the old reliable Universal brand. Send for our free booklet with hints on the use of the hack saw.



West Haven Manufacturing Co.
NEW HAVEN, CONN.

NATIONAL SELF-OILING STEEL TUBULAR AXLES

Now made of high carbon steel.



Guaranteed to be stronger and more rigid than solid steel axles. We make both. Write us

National Tubular Axle Co., EMIGSVILLE, PA.

Electric Forge Blowers Excel All Others

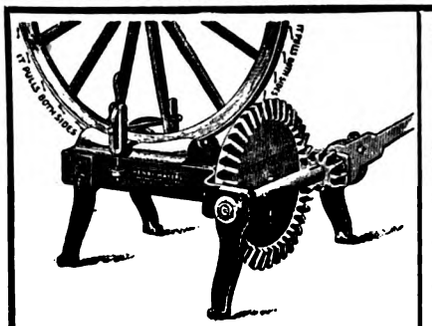
A Good Blower That Blows Everybody Good.

Write for Prices and Circulars



MODERN MACHINERY MAKES THE SMITH'S WORK LIGHTER

ROTH BROS. & CO.
27-29 So. Clinton Street,
CHICAGO, ILL.



Weighs 850 lbs.

1st. Henry Mayers Machinery Co. has been incorporated for $50,000 under the name of

Mayers Tire Setter Mfg. Co..
1721 N. 8th St., ST. LOUIS, MO.

Nothing Succeds Like Success.

2nd. The 1907 machine weighs 850 lbs. and every ounce of it is **Steel.**

3rd. The **SCREW is 5 inches** in diameter, weighs **210** lbs and has **2** threads to inch.

4th. The **ONLY** one in which **Both Heads** come together at same time.

5th. We will not let you pay us a cent until **YOU test, try and satisfy yourself** that its what you want—Fair, is it not?

6th. **LET 'S DO BUSINESS.**



COATES ELECTRIC CLIPPER

Clip your horse and sharpen his toe calks with the same machine. Move the light clipper around, no need to move the horse. You should know all about **Coates Flexible Shaft Machine.**

Send for Book A. B.

COATES CLIPPER MANF'G CO.,
WORCESTER, MASS.

Scott's IXL ALL High Speed Steel

Will cut at least one speed faster than any other high speed steel on the market.

Write for Catalog covering entire line of SCOTT TOOL STEELS.

THE BOURNE-FULLER CO.,
Cleveland, O.

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"MORSE"

A name familiar to the whole world in connection with high grade tools



DRILLS
REAMERS
CUTTERS
CHUCKS
TAPS
DIES
MACHINES
AND
MACHINISTS' TOOLS

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New Bedford, Mass., U. S. A.

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The Dealer's Profits

BUY WHEELS DIRECT FROM THE FACTORY

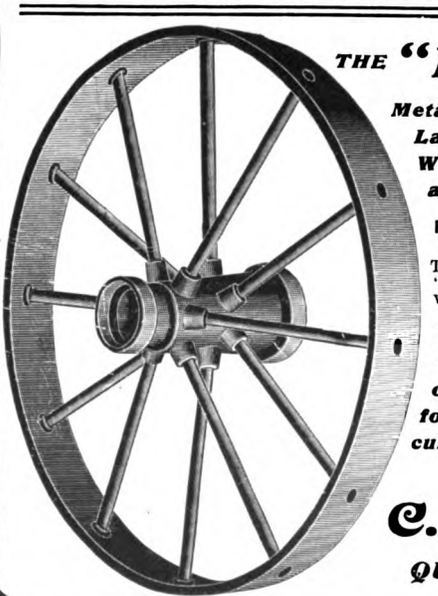
We can save you money on all sizes of wheels; in the white, painted any color and with steel or rubber tires. We bore wheels for boxes without extra charge. Give us a trial order and we will make you one of our many satisfied customers. Write for special prices to *American Blacksmith* readers.

Carriage Wheel Supply Co.
UNION CITY, IND.

BUSH  BUSH

The ***"BUSH"*** wagons are the best on the market. Made by experienced wagon builders. Of the finest material. Well ironed throughout. The "BUSH" handy low-down truck wagon cannot be beaten.

WRITE FOR CIRCULAR AND PRICES.



THE ***"BUSH"***

Metal Truck Wheels Last Longer and Wear Better Than any other Brand.

Patented July 11, 1899.

This cut represents the "Bush" Metal Wheel with our patented hub.

We manufacture a complete line of metal wheels for corn-planters, cultivators, plows, Etc. Etc.

C. BUSH,
QUINCY, ILL.

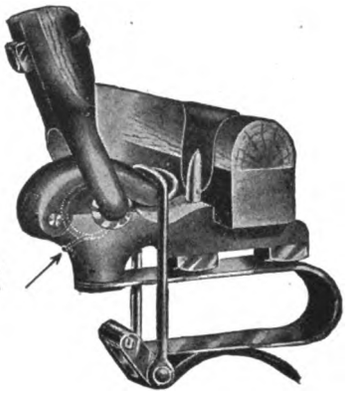
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ECCLES BALL-BEARING COUPLINGS

With Leather Bushings in one piece, securely fastened in the socket of the Coupling.

When the shafts are removed, the bushing does not come out, but stays in the Coupling where it belongs. NO LOST BUSHINGS WHEN YOU USE OUR COUPLINGS.

We would like to send you our circular and have you try our Couplings. They will save you money.



Patented Nov. 25, 1902.

The Spring is pivoted at the front so that it can be turned forward out of the way of the wrench while clipping the Coupling to the axle.

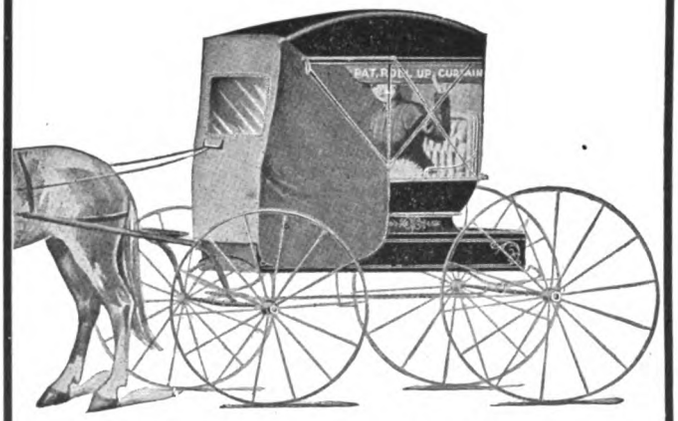
These are two of the good points, but there are plenty more desirable features in our Couplings.

We also have a Catalog showing our full line of **Carriage and Wagon Forgings** all of which we make.

RICHARD ECCLES CO., Auburn, N. Y.

BUOB & SCHEU

MFG'S OF



Top Buggies, . .	$30.00	and up
Rubber Tire Runabouts,	40.00	" "
Storm Buggies with Patent Roller Curtains,	38.00	" "
Buggy Tops, . .	4.50	" "

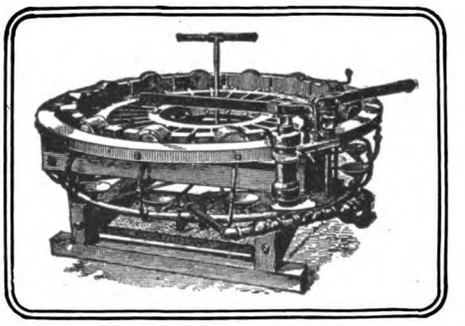
Auto Tops, Buggy Cushions and Backs. Storm Aprons, Poles and Shafts, and Trimmings of all kinds.

Write for 100 page Catalogue.

We can save you money.

408 to 412 Gilbert Avenue, CINCINNATI, OHIO

The West Hydraulic Tire Setter



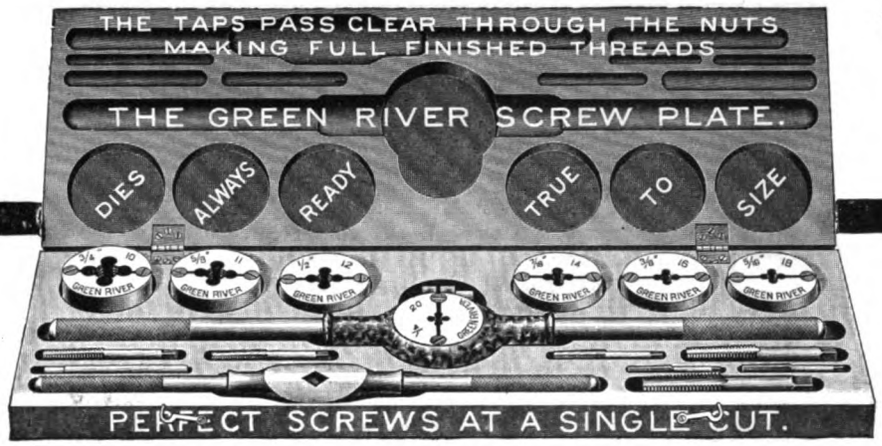
Is a **Round Machine** for tiring **Round Wheels,** and compresses the tire at all points—not all in one spot—and the compression is so slight at any particular point that tire bolts do not have to be removed when resetting an old tire, neither are holes closed so bolts are tight in tire. Wheel is made compact and joints tight.

WRITE US YOUR REQUIREMENTS.

The West Tire Setter Company

ROCHESTER, N. Y.

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GREEN RIVER SCREW PLATES

AND

Lightning Full Mounted Screw Plates

Are considered by all Blacksmiths as being the most superior screw cutting tools manufactured.

We have made stocks and dies doing "Perfect Threads at a single cut" since 1872.

THIRTY-FIVE years leaders in our line.

WILEY & RUSSELL MFG. CO.

SOLE MAKERS

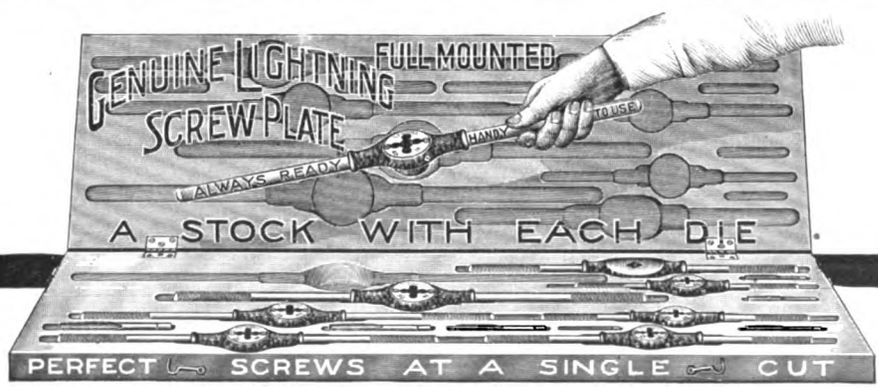
GREENFIELD, MASS., U. S. A.

Cut this out and return to us and we will send our new Catalogue No. 33 D, free of charge.

WILEY & RUSSELL, Greenfield, Mass., U. S. A.:

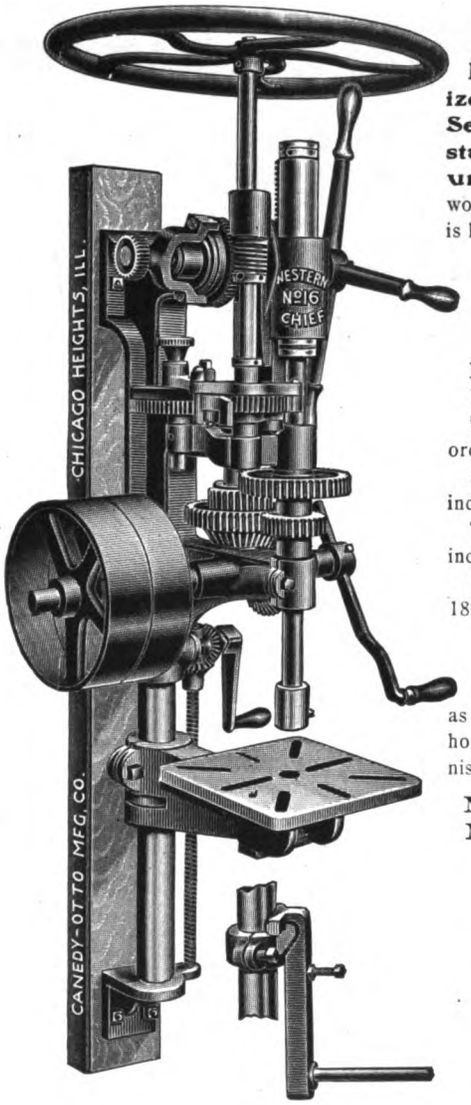
Please send us your new catalogue and price list No. 33 D, illustrating your full line of screw plates, taps, reamers and bolt cutters.

NAME..... ADDRESS.....



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No. 16 = Western Chief Drills = No. 17



DESCRIPTION

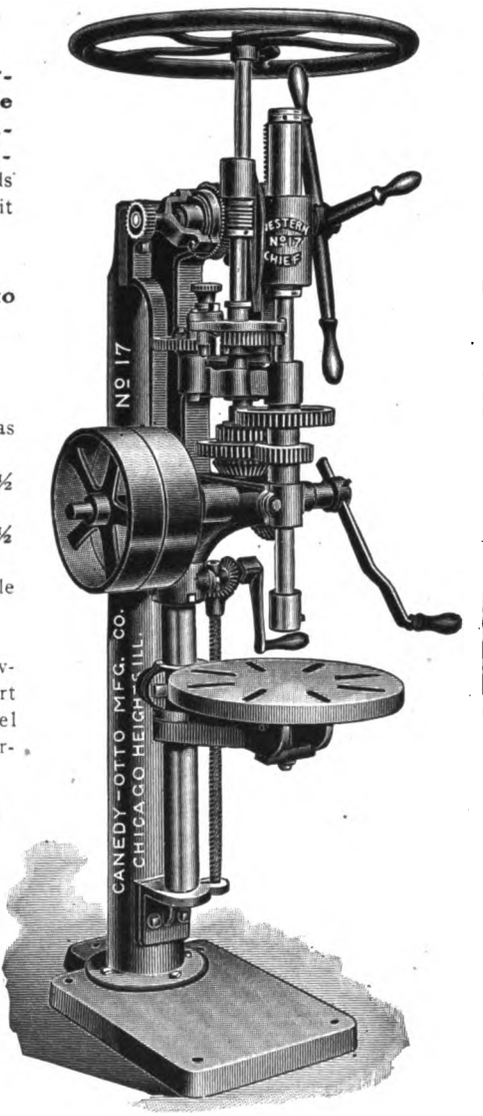
Hand Lever Feed, also Horizontal, Gear Driven Positive Self Feed, changeable instantly to fast, slow or medium speed as desired. These feeds work independent of each other and bit is lifted quickly.

Cut Gears.
Raise and lower device to table

Drills to center of 24-inch circle.
Bores from 0 to 1½ inch.
Takes Bits ½ or 41-64 Shank as ordered.
Spindle has up and down run of 8½ inches.
Table has up and down run of 15½ inches.
Greatest distance from table to spindle 18½ inches.

Wheel rims can be drilled by removing table and using the forked support as a wheel holder. A special wheel holder attachment as illustrated is furnished when desired.

No. 16, Weight 360 pounds
No. 17, Weight 560 pounds





Royal Blower

"The Successful Blower"

Gear case is oil-tight and dust-proof. Gears run in a continuous bath of oil. No spiral gears, worm gears or ball-bearings. Crank turns forward or backward. Fan 12 inches. Weight 135 pounds.

Fire pot is 8x9 1-2x4 inches inside. Needs no Clay.

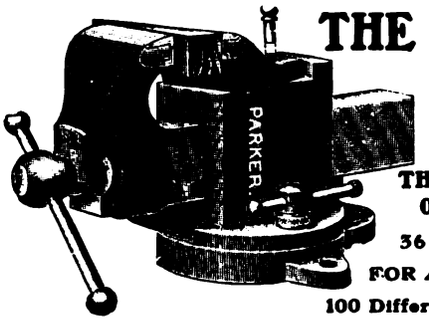
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"Popular Tools"
Made by

CANEDY - OTTO MFG. COMPANY,

Chicago Heights, Ill.

FOR SALE BY
First-Class Dealers
EVERYWHERE.

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THE PARKER VISES

THE MOST RELIABLE ON THE MARKET

36 Different Styles.

FOR ALL PURPOSES.

100 Different Sizes.

Parker vises will be found in the best equipped shops in the country. No other vise has given to the trade such general satisfaction. Our new line of improved vises has reinforced sliding jaws, making the Parker vises stronger and more durable than ever.

Made of a blending of steel and best iron in the castings.

The steel faces on these vises are milled and fitted to the jaws and are removable. Have self-adjusting back jaws which automatically adapt themselves for holding wedge-shaped pieces.

STRONG DURABLE HANDY



Our complete illustrated catalogue is free. Write today for price list also.

A tool of many uses. Both round and pipe jaws interchangeable. Weight, 76 lbs.

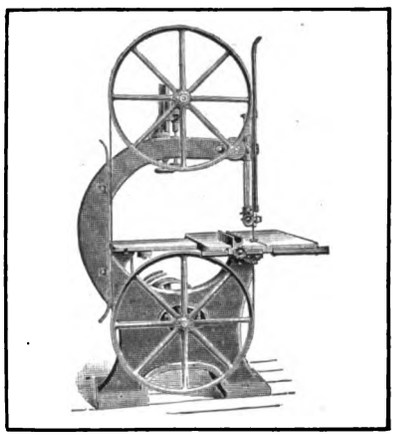
THE CHAS. PARKER CO.,

MERIDEN, CONN.

YOU NEED Wood Working Machinery.

Wood Working Machines in your Shop will enable you to do better work and more of it than you can do with hand tools.

We Build Just the Machine You Need.



Catalog describing a fine line of moderate priced BAND SAWS, SAW TABLES and JOINTERS mailed on request.

SEND FOR IT NOW.

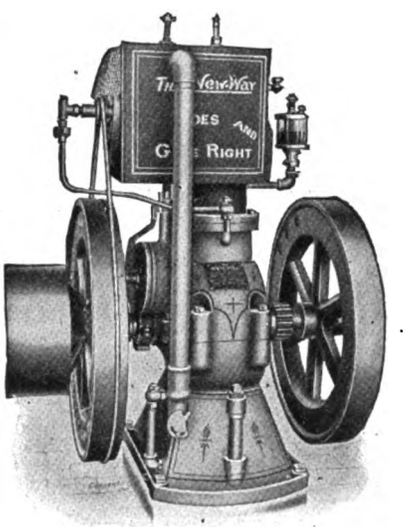
The Crescent Machine Co.,

245 Main St. LEETONIA, OHIO, U. S. A.

NOTICE TO BLACKSMITHS.

THE "New-Way" AIR COOLED

Is the Only GASOLINE ENGINE



Built especially for Blacksmiths' Use.

3 to 7 H. P. Horizontal and Vertical.

Look at the other engines first. Note the multitude of rods, springs and triggers described as **simple.** Remember that the water tank (always left out of the cut) has to be filled and emptied every winter day. To forget it once may mean a ruined engine. Remember that water cooled engines all have packed cylinder heads. Packing leaks and blows out. Inevitable trouble and loss of power sometime.

THEN LOOK AT AN ENGINE THAT IS SIMPLE

THE "New-Way"

One piece cylinder—no chance to leak—grows stronger with use. Everything enclosed—no frail parts—no water—not a piece of packing or a gasket in it—no gasoline pump troubles. It absolutely cannot be overheated under full load—any temperature—any length of time. Your judgment tells you to

WRITE FOR CATALOG "K." DO IT NOW.

60 Sheridan St. THE "New-Way" MOTOR COMPANY LANSING, MICHIGAN, U.S.A. **60 Sheridan St.**

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Cavalry Officers and Smiths in the United States Army Find "Capewell" Nails Better Adapted to Their Requirements than Any Other Brand.

Where the demands of the service are most exacting "The Capewell" horse nail—on account of its remarkable STRENGTH and DURABILITY—meets the requirements perfectly.

Interesting letters received by us from Officers and Smiths in the United States Army prove conclusively that "The Capewell" nail is THE FAVORITE for shoeing CAVALRY HORSES.

In fact: There is no requirement too exacting, no service too severe for the STRENGTH of the MOST RELIABLE and PERFECT horseshoe nail in the world—"THE CAPEWELL."

It Will Pay You, Therefore, Always to Insist Upon Having "The Capewell."

PLAIN PATTERN REGULAR HEAD.

PLAIN PATTERN CITY HEAD.

Made by **The Capewell Horse Nail Company**

HARTFORD, CONN.

The Largest Manufacturers of Horse Shoe Nails in the World.

BRANCHES

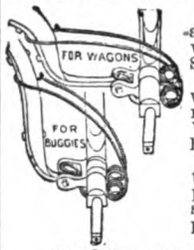
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Catalogue Free upon Application.



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RACINE SHAFT SUPPORTS



The ouly Shaft Support and Anti-Rattler that will work on both Buggies and Spring Wagons.

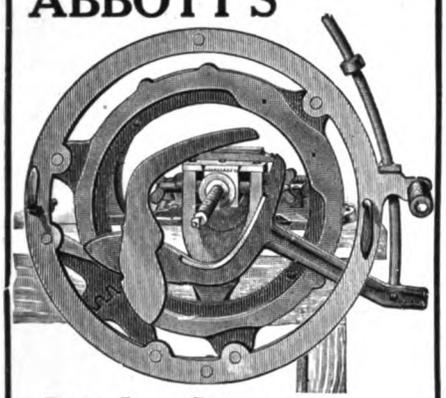
No wear on harness. No wear on horse's back, and no Anti-Rattler required. Will hold the shaft at any height.

Ask your jobber for them. If he cannot supply you, write us for descriptive circular and prices.

Send for our complete Catalog.

Racine Merchandise Co.
RACINE, WIS.

ABBOTT'S

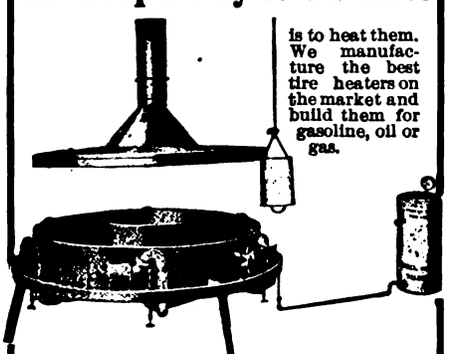


Little Giant Hub Borers
AND **Abbott's Box Puller**

Made by ABBOTT & CO., Hudson, Mich., and sold by all Dealers in Carriage Makers' Machinery.

PHINEAS JONES & CO., Newark, N.J.
General Agents for the Eastern States

The Proper Way to Set Tires



is to heat them. We manufacture the best tire heaters on the market and build them for gasoline, oil or gas.

ASK YOUR DEALER

to tell you about our goods and write for booklet describing fully tire heaters,- full circle center King Bolt and Rear King Bolt, 5th Wheels, Body Braces, Flare Board Irons, End Gate Springs, and Blow Pipes for brazing rubber tire wires.



Write for Booklet.

GOGEL MFG. CO.,
Toledo, Ohio.

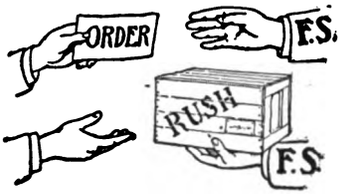
"TOOLS THAT WEAR" **HELLER'S** CELEBRATED AMERICAN HORSE RASPS, FILES AND FARRIER'S TOOLS

will save you Time and Money. Their Superior Quality sets a known and tested Standard of Excellence. All made from our own Production of Special Refined Clay Crucible Steel and tempered by a Secret Process. New Catalogue Mailed Free on Application.



"ROUNDING HAMMER"

HELLER BROTHERS CO., Newark, N. J., U. S. A.



Free samples on request.

We not only "deliver the goods"—but promptly, too.

"Raven Gloss" Ready-Mixed Carriage Paints live up to their name.

FELTON, SIBLEY & Co.,

Mfrs. Colors, Paints, Varnishes. 136-140 N. 4th St., PHILADELPHIA.

The Vulcan for Tuyere Iron Has No Equal



Are winning their way on the strength of real merit. New design based on long experience. Rapid heater and will not crack as others do. Cast in one piece. Automatic vent alone is worth price of Tuyere. Steadily increasing sales is proof that Blacksmiths know a good thing when they see it.

Send for Booklet, "Some Forge Troubles, and How to Avoid Them."

HOOSIER FORGE CO.,
Connersville, Ind.
Chicago office, 1121 Stock Exch. Bldg.

THE PERFECT POWER HAMMER



Made in 3 sizes.

Only one horse-power to run it. The best Trip Hammer in the U. S., by reason of its simple construction, efficiency and durability. Used exclusively by some of the largest carriage builders in the country.

Write for testimonials and prices to

Macgowan & Finigan Foundry & Machine Co.

41-42-43 Gay Bldg. ST. LOUIS, MO.



Always the same report.

"PIKE CORUNDUM WHEELS

are the best for Foundry use and Tool grinding. Cool, free and fast cutting." Made of highest grade Corundum obtainable. Every user of a Pike Corundum Wheel is insured against accident by the Casualty Company of America. **Send for new illustrated Catalog.**

PIKE MANUFACTURING CO.
PIKE, N. H.

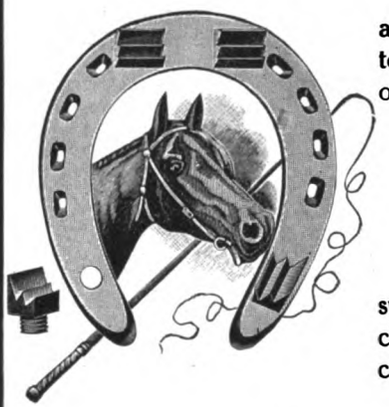
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JUST TO ADVERTISE

Always Sharp Calks, we will send you a handsome booklet telling you all about

OUR CALKS



and why they are the most durable and satisfactory. They have been a great success throughout the snow-belt, and that is why

WE ARE



sure that if you try them, you will buy no other calk, for horses shod with "Always Sharp" calks, can be driven up hill or down,

GIVING THEM FREE

rein, no matter how slippy the road may be, it gives greater hauling power. We want you to try them

THIS SEASON

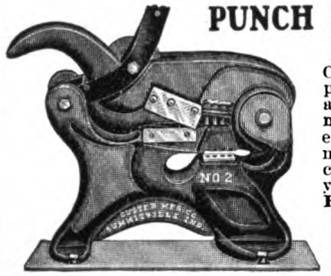
as we have improved our manufacturing facilities, reduced the price, and bettered the calk. We want you as an agent and will be pleased to answer all your enquiries, or send samples, enough to shoe your own horse if you wish, and convince yourself that there is no better calk.

ALWAYS SHARP CALK MFG. CO.

JERSEY CITY, NEW JERSEY.

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THE NEW CUSTER PUNCH AND SHEAR



Combines important points not known to any other machines made. The most powerful machine on the market. Drop us a card and we will tell you all about it.
For sale by jobbers.



THE HANDY TIRE BOLTER.

Handiest and most convenient wrench made. Each wrench is equipped with 3 size sockets, 1/8, 3/16 and 1/4.

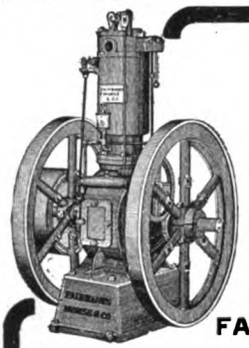
CUSTER MANFG. CO.,
SUMMITVILLE, IND.

HONEST DEALINGS.

Before an advertisement is accepted for this Journal, inquiry is made concerning the standing of the house signing it. Our readers are our friends and their interests will be protected. As a constant example of our good faith in **American Blacksmith** advertisers, we will make good to subscribers loss sustained from any who prove to be deliberate swindlers. We must be notified within a month of the transaction giving rise to the complaint. This does not mean that we will concern ourselves with the settlement of petty misunderstandings between subscribers and advertisers, nor will we be responsible for losses of honorable bankrupts.

THE VICTOR—on its Merits.

INSIST ON GETTING A VICTOR—it 's making satisfied customers for us every day.
MASSACHUSETTS SAW WORKS, Chicopee, Mass.



Look Ahead

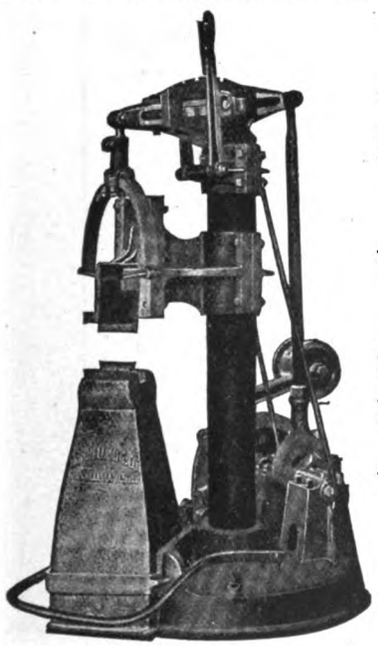
The far sighted blacksmiths are closing their 1907 contracts for

Fairbanks-Morse Gasoline Engines

Why not be an agent and install one in your shop where you can show it to the best advantage. They are so **Reliable** and so well known you can't help making money. Send for Proposition No. 457AP.

FAIRBANKS, MORSE & CO., CHICAGO, ILL.
12 DEY ST., NEW YORK.

Modern Power Hammer



The ONLY hammer on which you can get a LIGHT BLOW at FULL SPEED.

The shifting lever controls the length of stroke.

Set it in any one of the five notches and then handle the hammer with the treadle the same as any other.

Actually five hammers in one.

Write any jobber or the

THE GRINNELL MFG. CO.,
GRINNELL, IOWA.



Pay Day

What Does it Mean to YOU?

No matter what your position may be, whether day laborer or office worker, if you are in that discouraged line of men who get the same pittance week after week without prospect of anything better, it is time you appealed to the International Correspondence Schools. For 14 years they have been qualifying dissatisfied workers for better positions and higher salaries.

No matter what your circumstances are, they will qualify YOU for *a better position, a higher salary, and a safe future.* The way is plain, easy, and sure for earnest men. It puts you under no obligation to find out how we can help you. Simply mark and mail the coupon below. *Can you afford to neglect an opportunity for advancement?*

INTERNATIONAL CORRESPONDENCE SCHOOLS
Box 1302, Scranton, Pa.

Please send me your booklet, "1001 Stories of Success," and explain how I can qualify for the position before which I have marked X.

Foreman Blacksmith	Electrician
Foreman Machinist	Architect
Foreman Toolmaker	Structural Engineer
Foreman Pat'nm'k'r	Contractor & Builder
Foreman Molder	Foreman Plumber
Mech. Engineer	Civil Engineer
Machine Designer	Surveyor
Mech. Draftsman	Mining Engineer
Stationary Engineer	Bookkeeper
Electrical Engineer	Stenographer
Elec. Lighting Supt.	U.S. Civil Ser. Exams.
Elec. Railway Supt.	Ad Writer

If the position you wish to gain is not in the list, state what it is here_____.

Name _____

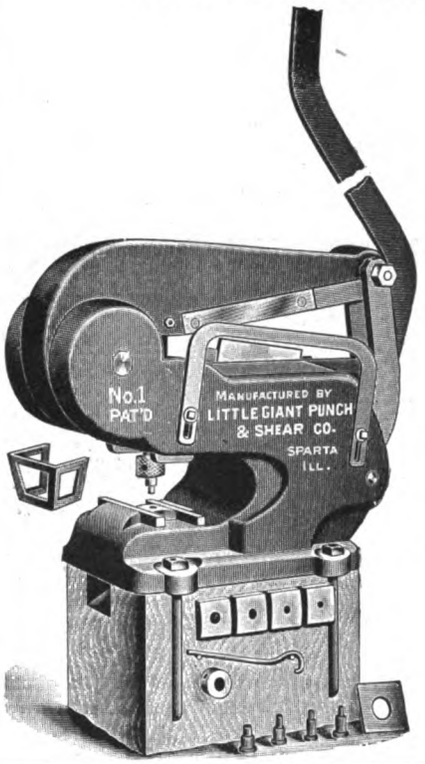
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City _____ *State* _____

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Little Giant COMBINED Punch and Shear

The Most Powerful Lever Punch and Shear Made.



MADE IN THREE SIZES.

No. 1—Will punch 5/8-inch hole in 1/2-inch iron. Cuts iron 5/8-inch thick and 1-inch round. Weight, 515 lbs.

No. 2—Will punch 1/2-inch hole in 1/2-inch iron. Cuts iron 1/2-inch thick and 7/8-inch round. Weignt, 350 lbs.

No. 3—Will punch 3/8-inch hole in 3/8-inch iron. Cuts iron 3/8-inch thick and 3/4-inch round. Weight, 280 lbs.

5 PUNCHES and DIES with EACH MACHINE. 5

Only ONE operation of the Lever does the work. No changing required. Lever about 8 feet long.

IT IS THE BEST—WHY?

LAKE PLACID, N. Y., Nov. 19, 1906.

Gentlemen:—The Little Giant Punch and Shear we got of you last year is the best tool a blacksmith can have in his shop. We are working four men in our shop and would rather have it than the fifth man, because it is here every day and ready to punch and shear all you claim it to do, and does it easy. If you like to use our name for reference at any time, we will answer every one.

Truly yours, DELORIA BROS.

DUBLIN GA., Nov. 20, 1906.

Gentlemen:—I have been using your Little Giant Punch and Shear for 12 months, and I get more out of the machine than it is guaranteed to do.

Respectfully, W. O. OGBURN.

For Sale by your Jobber. If not, write us. Send for Circular.

Little Giant Punch & Shear Co.,

SPARTA, ILL.



KERRIHARD'S POWER HAMMER

A first-class machine sold at a low price. Contains every modern feature. Strongly built of the best material. Will do your work easily and quickly and will do it right.

WRITE FOR FREE BOOKLET AND PRICES.

THE KERRIHARD CO.,

HAMMER AND GRINDER DEPT.,

RED OAK, IOWA, U. S. A.

Canadian Inquiries and Shipments

BURRIDGE-COOPER CO., Ltd.,

Winnipeg, Manitoba.



THE KERRIHARD GRINDER

Fitted with Sawing Table and Frame

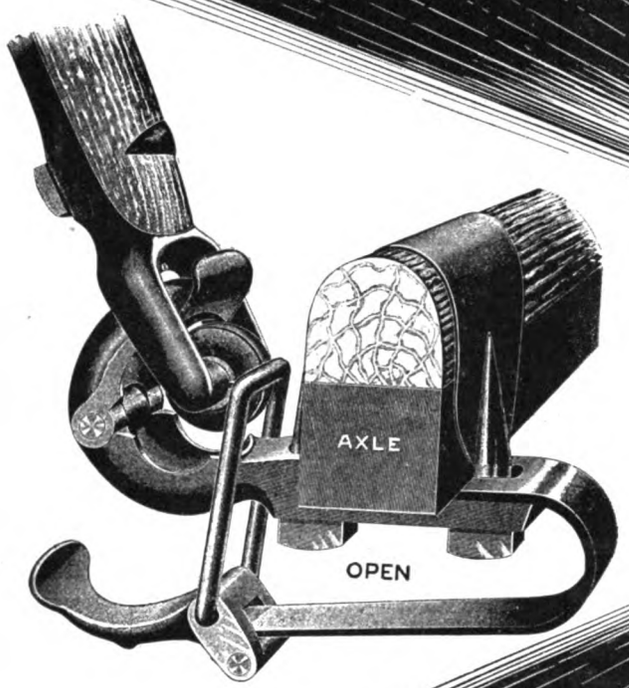
Has all the features of the more expensive and elaborate saw tables. Table and frame can be removed instantly and grinding wheel put on for grinding. Will take wheels to 20 in. diameter, and buzz saws 16 in. diameter.

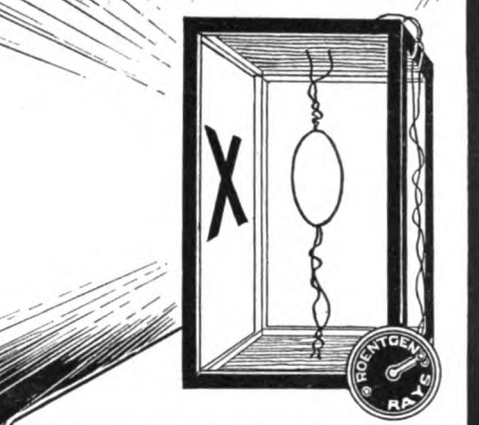
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All parts of every *Bradley Shaft Coupling* are made of *STEEL,* with the exception of the *Leather Bushing*.

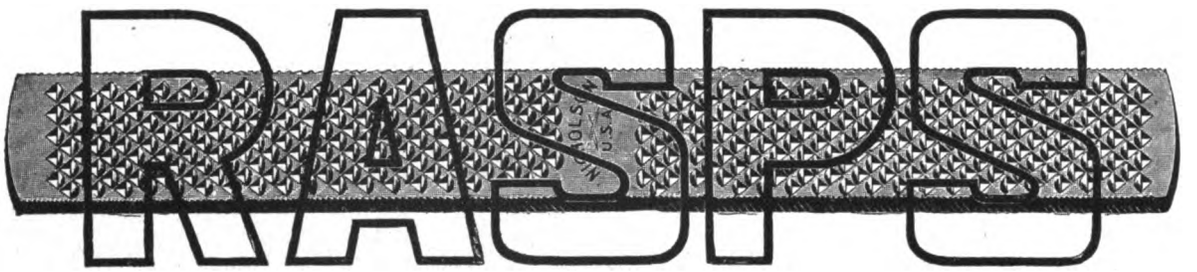
This *Leather Bushing* is the only part that wears. It will wear indefinitely and can be replaced, when worn out, by anyone, and the *Coupling* made as good as new. The *Leather Bushing* is made of hard oak leather, formed by special machinery. The *bushing* is soaked in hot tallow, which makes it self-lubricating during its life.

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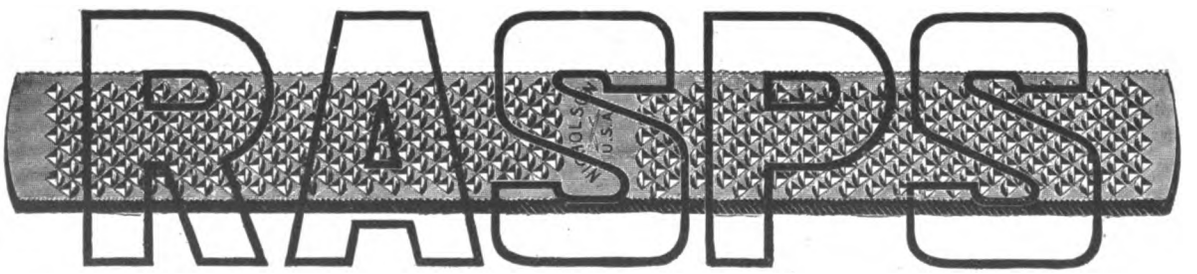
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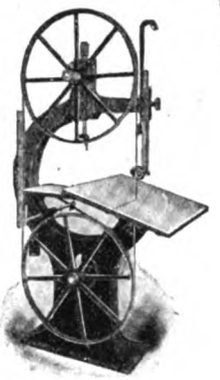
Carried in stock at our various factories in AMPLE QUANTITIES to enable us at all times to promptly fill orders of any size.

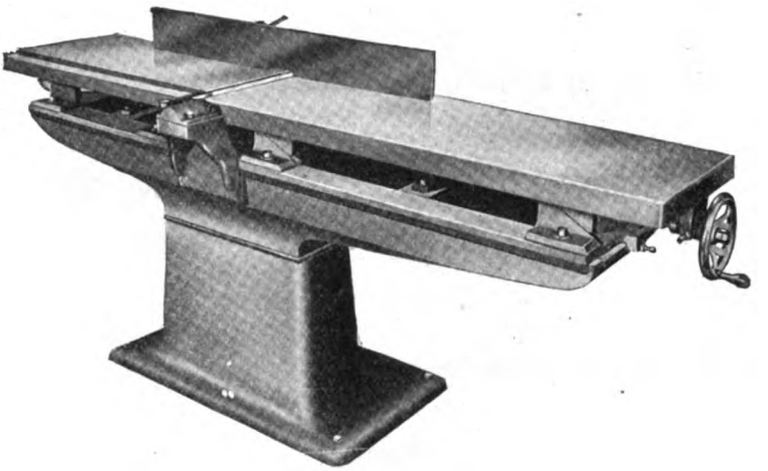
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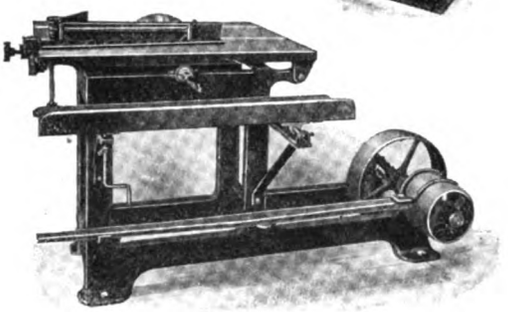


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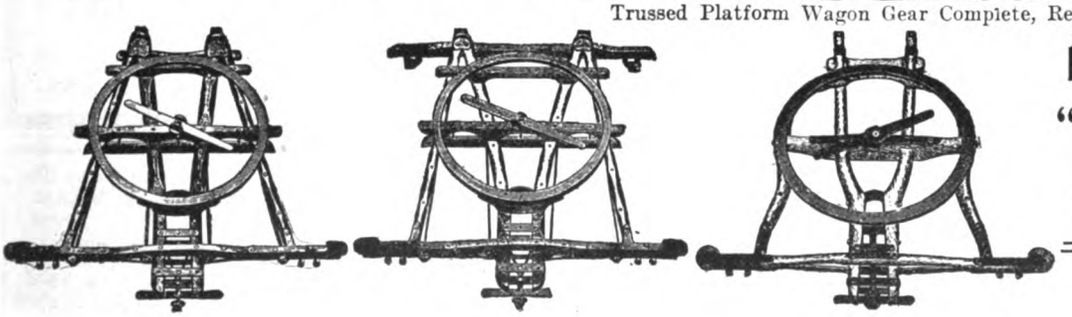
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Trussed Platform Wagon Gear Complete, Ready for Body.



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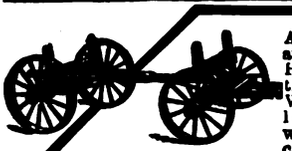
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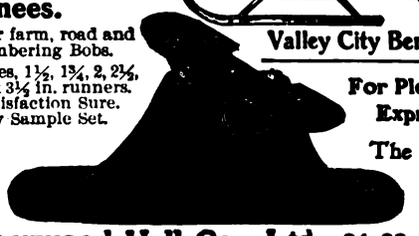
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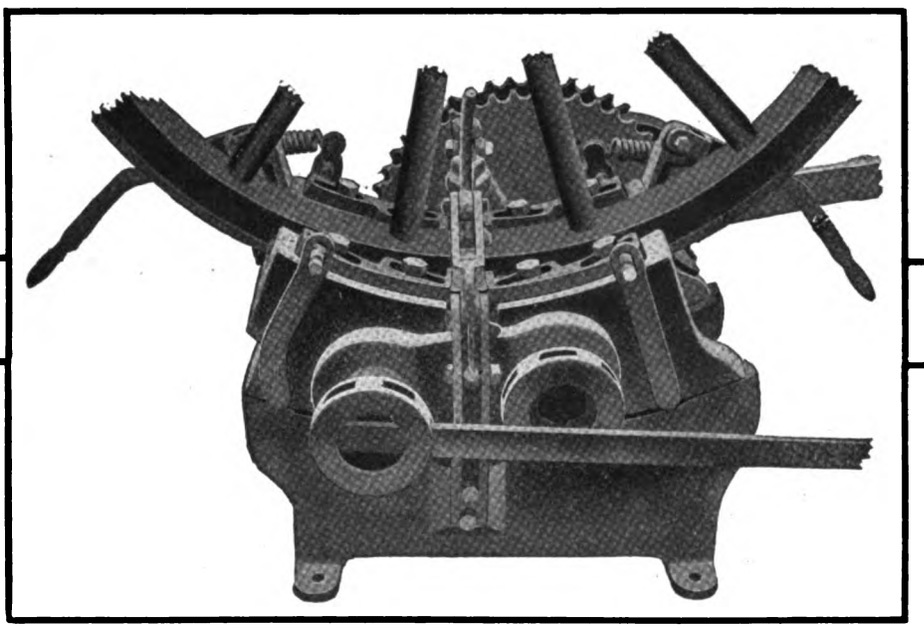
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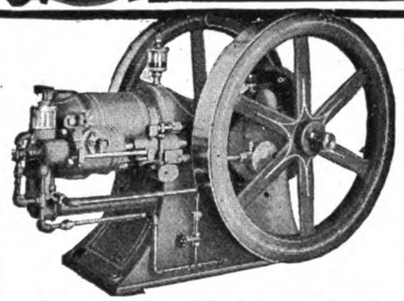
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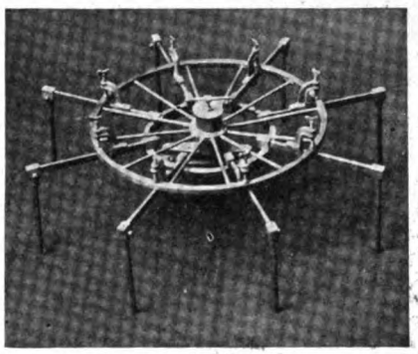
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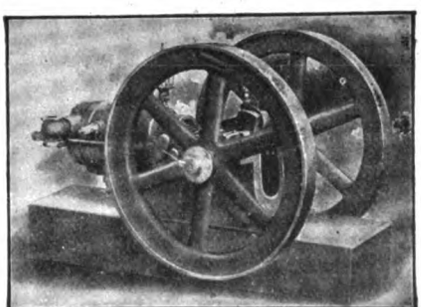


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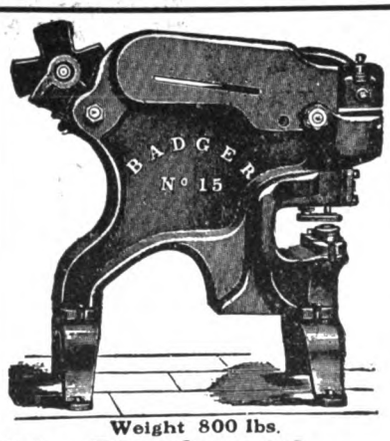


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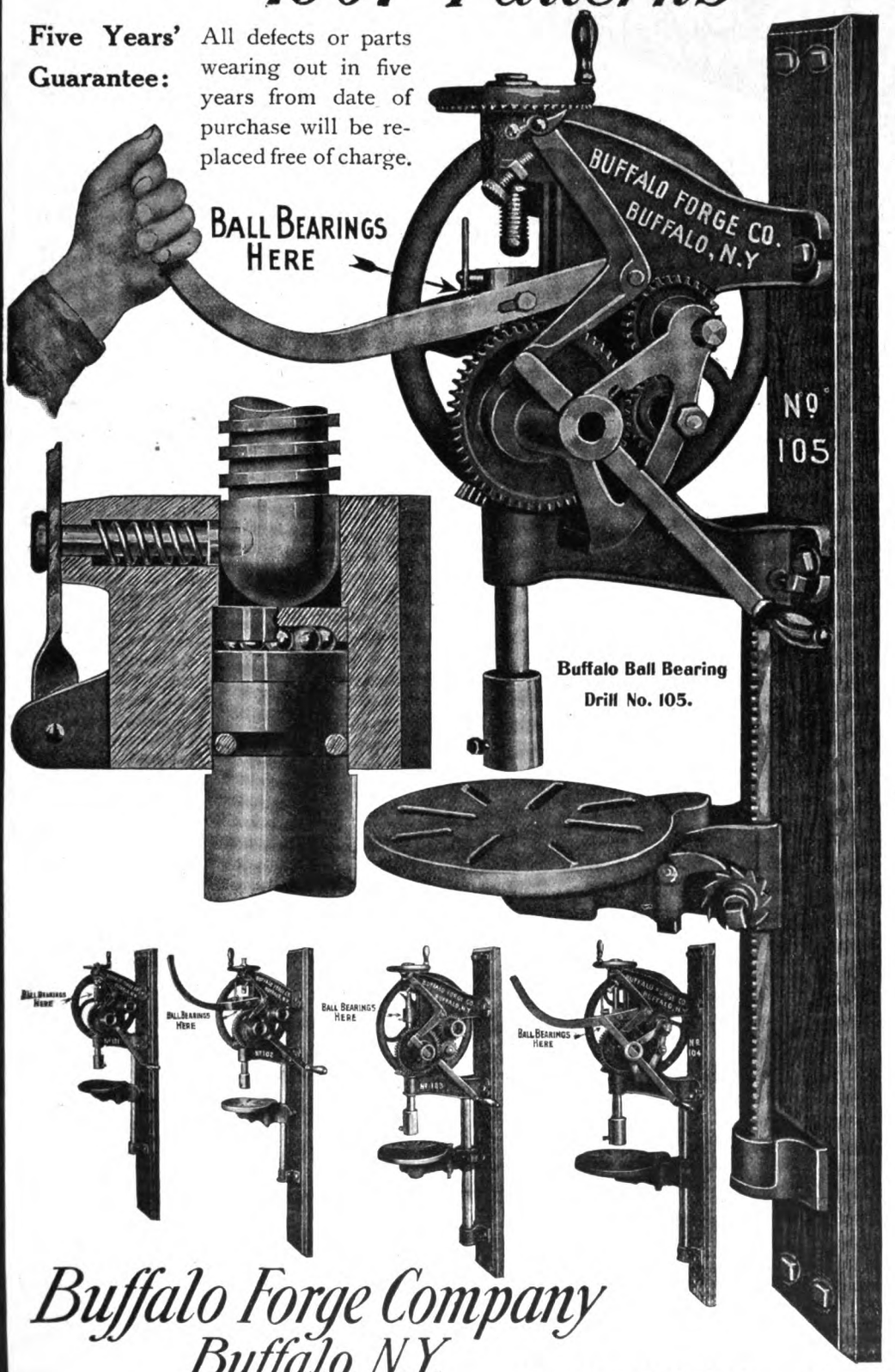
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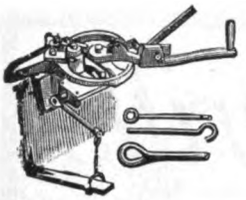
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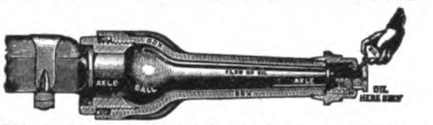
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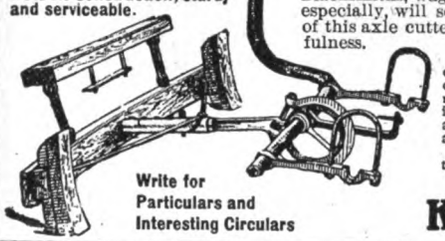


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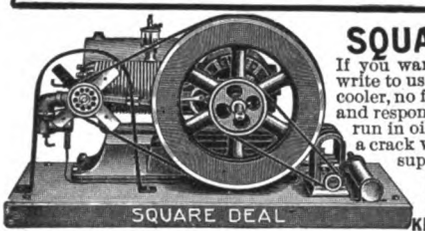
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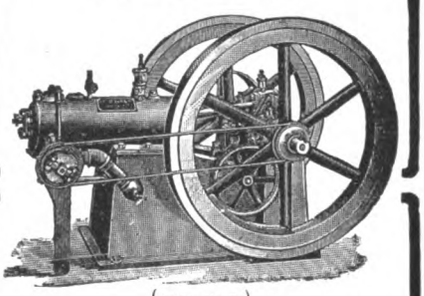
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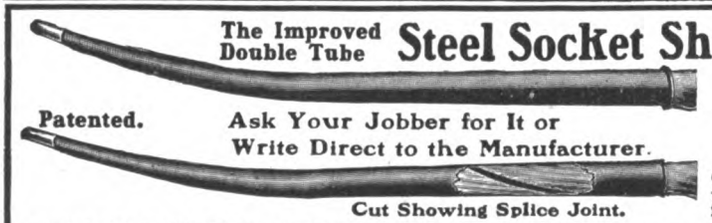
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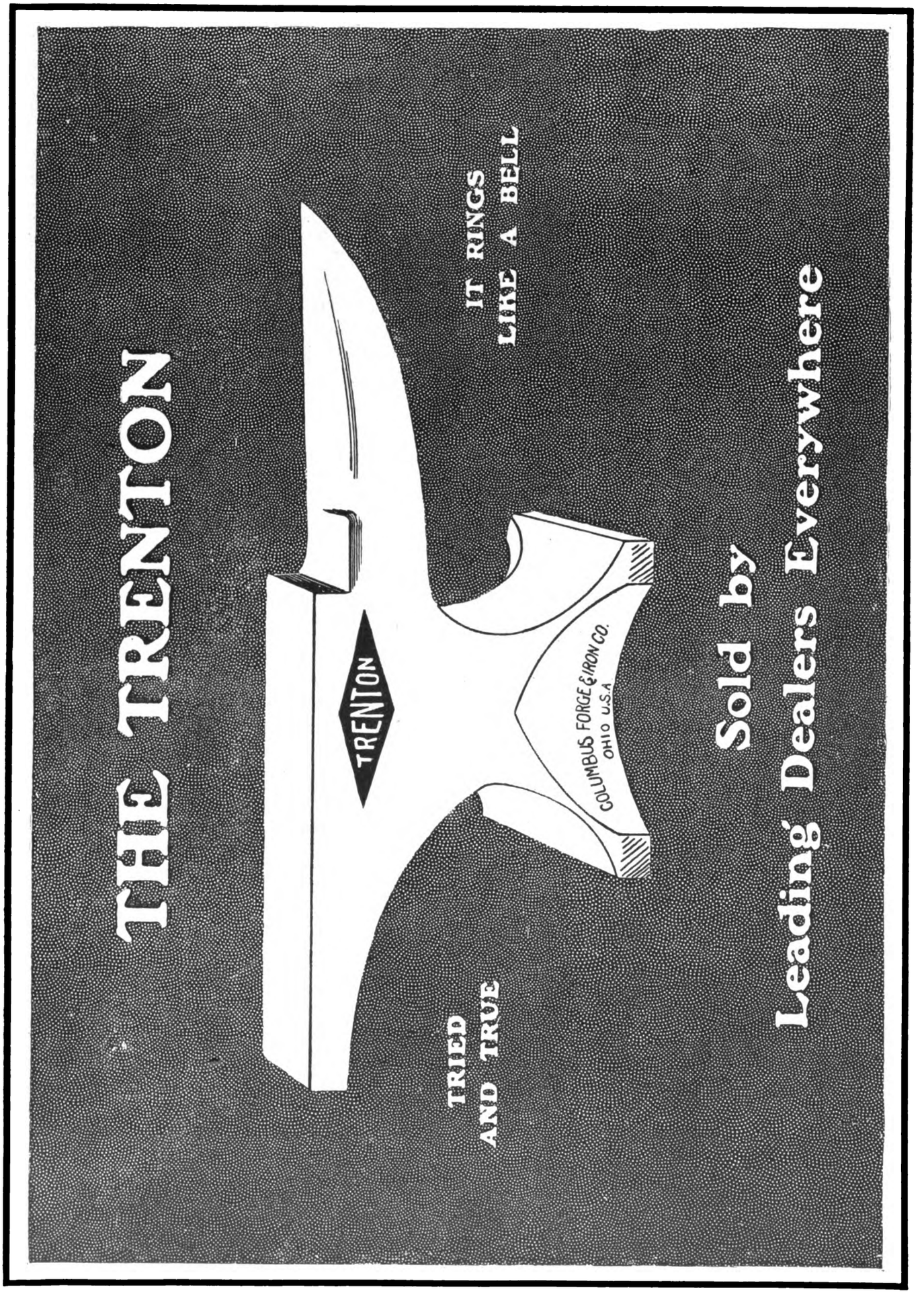
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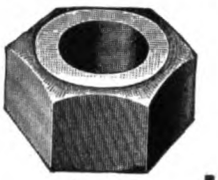
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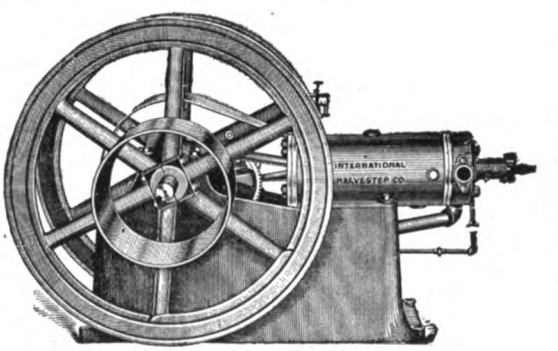
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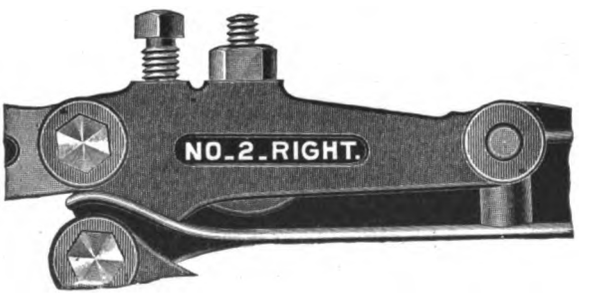


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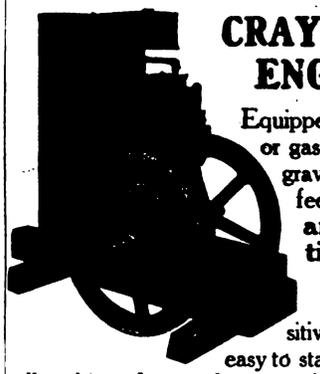
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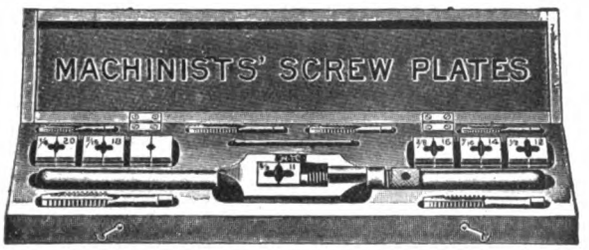
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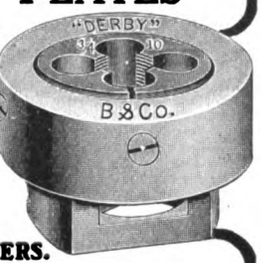
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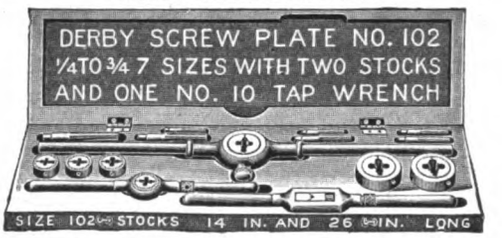


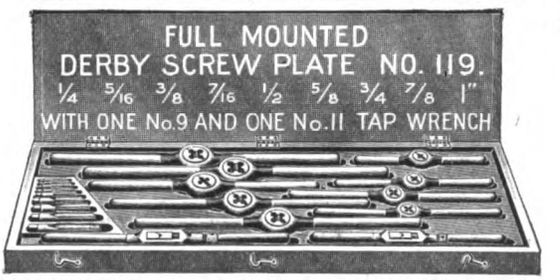
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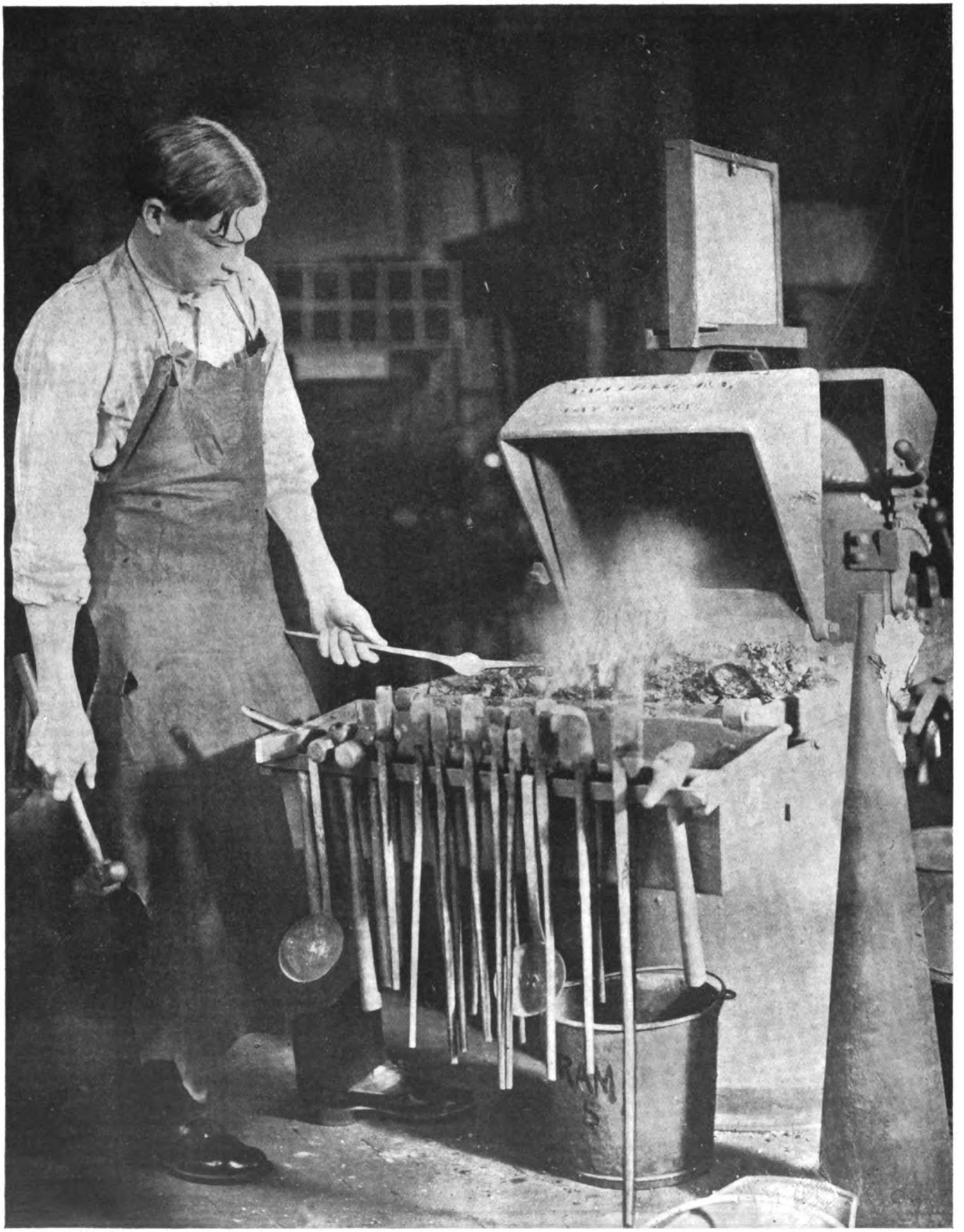
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As this issue will go to many craftsmen who have never before known THE AMERICAN BLACKSMITH, a word about the paper will be in order. Each issue of the year has exactly the same number of reading matter pages and the same amount of practical information as are given in this January number, which is, therefore, a fair sample of what all issues of THE AMERICAN BLACKSMITH are like. We guarantee to give readers at least 24 pages of solid craft reading every month. No trade puffs, write-ups or stale clippings allowed. Our writers are among the highest craft authorities. Such men as E. W. Perrin, John L. Bacon, E. W. Markham, M. C. Hillick, C. H. Richardson, Nels Peterson, and many others give our readers the benefit of their broad experience. And the coming year's programme promises better, richer and more valuable information than ever before.

THE AMERICAN BLACKSMITH brings the craftsman in touch with a better knowledge. It acts as introducer to larger success, bigger opportunities. It solves the smith's daily problems and perplexities, and brings him into closer relationship with smithing matters. This paper will give you an idea of what you are missing each month, in case you are not a subscriber. It is a gratifying fact that once a smith comes to know THE AMERICAN BLACKSMITH he rarely stops taking it.

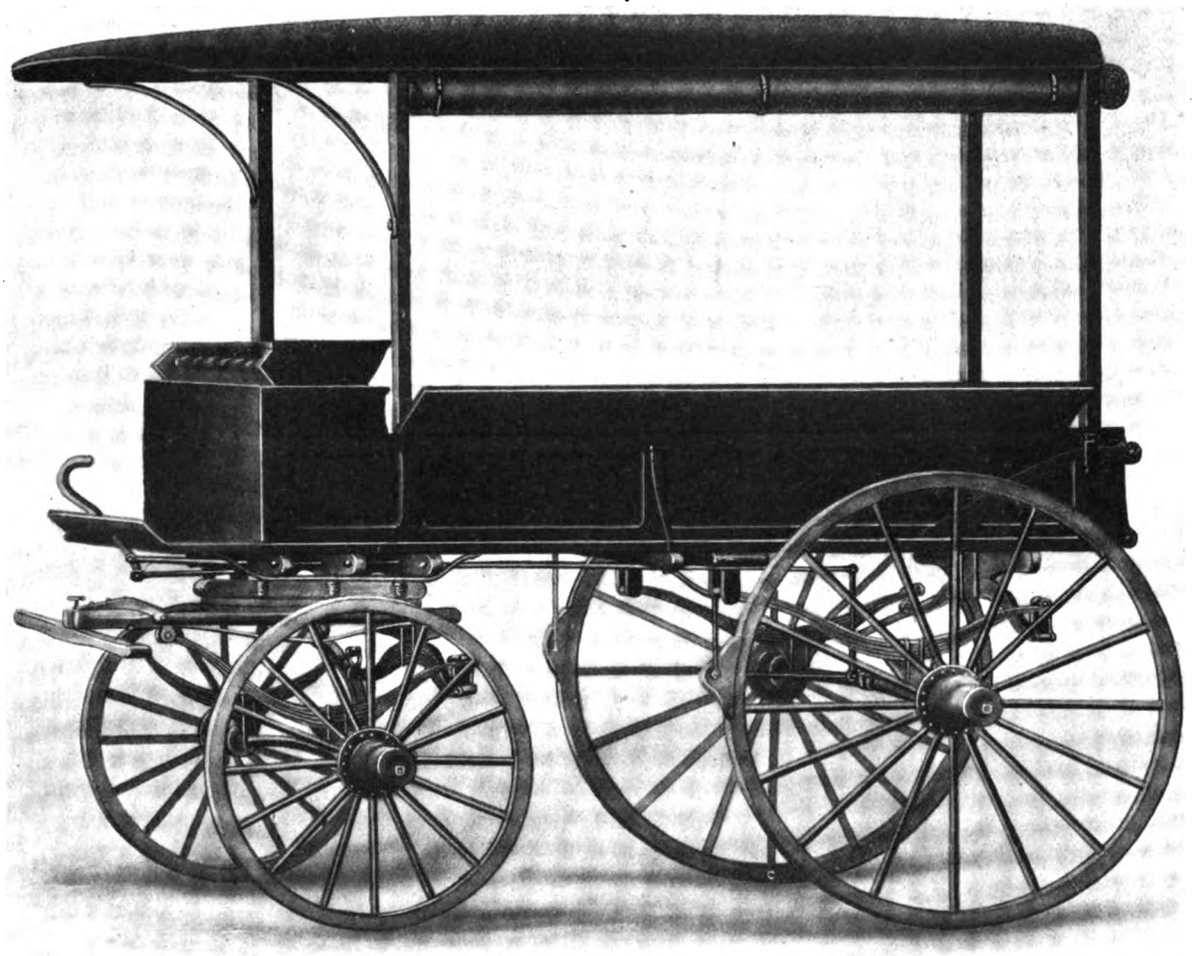
Owing to the great number of manuscripts submitted for consideration in our prize contest, which closed December 10th, we are unable to announce the winners in this number. We hope to do this next month. Some very helpful and practical prize-contest articles have already made their appearance, and others will be published from time to time throughout the year. In this connection let us remind you that good, practical articles and craft items are always welcome. Our readers are invited to use these columns whenever a craft tale is to be told, for we believe that the practical smith in every-day harness is best acquainted with the needs of his brothers, and we, therefore, want "the man behind the anvil" to tell of his daily experiences, his jobs, his tools and equipment, his shop-made machines.

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THE RIGHT HEAT—CAREFUL HEATING IS ESSENTIAL TO SUCCESSFUL FORGING

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A DELIVERY WAGON BUILT WITH RUNNING GEAR OF FULL PLATFORM PATTERN FOR HEAVY WORK

Plan for Building a Heavy Delivery Wagon.

NELS PETERSEN.



THE accompanying plans are for a delivery wagon, to withstand heavy service. As indicated in draft, the running gear is of the full platform pattern, which is better adapted for this class of wagon, as it often becomes necessary to back into and turn around in narrow alleys, and in crowded streets.

For a man accustomed to building this class of work but little explanation concerning its construction is needed, as he would know from a glance at the drawing how to proceed, the dimensions being given. But for the benefit of the new beginner, who never did much of this kind of work, a little instruction may be necessary to a full understanding.

Beginning with the body, we first lay out the sills, the desired width, thickness and length having been decided, which in this case is 4 inches by 1½ inches by 11 feet long, from the extreme front end of the foot board to the rear of the back cross-bar. This latter is morticed to receive the tenons of the sills. Mortices are also cut into the side sills, about 11 inches from the front end, for the front cross sill, which is 3 feet 4 inches long between the shoulders; this makes the body 4 feet wide from out to out. The sills are grooved to a depth equal to the thickness of the foot bar and the bottom of the body—in this case ⅞ of an inch. The front corner pillars, and also the pillars forming the back risers for the seat, are morticed into the sills, extending upward 18 inches, to which the sill of the seat is fastened. The rear corner pillars are likewise morticed into the rear cross-bar, the whole forming the side panels are 11 inches deep by ¾ of an inch thick, and are fastened to the sills and pillars with screws, to hold them in place until ironed off. A piece of hard hickory, 1-inch square and running the full length of the body, is screwed to the top edge of the panel. Projecting over ¼ of an inch, mouldings ¼-inch thick are then fitted around the corners and the center of the panels, extending from the sill to the top rail, as shown at A in Figs. 1 and 2. The body proper is 12 inches deep inside. To provide further room for carrying

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QUAINT TWO-WHEELED CARTS DRAWN BY SLOW-MOVING WATER BUFFALOES ARE SEEN IN THE PHILIPPINES

bulky goods, flare boards, 6 inches high, are set at an angle of 60 degrees and fastened on top of the panels. The whole being then secured with strap-bolts on the inside, and body braces running from the cross-bars to the panels on the outside, as shown in the several engravings.

For protection against wet weather, a top is fitted over the body, the frame work being shown in Figs. 1, 2 and 3. The post supporting the top is made of 2 by 2-inch stuff, 4 feet 1 inch high, from the bottom of the body to the lower rail on the top. A strap bolt runs through the sill and, ending with a T on top, is secured with bolts as shown at B, Figs. 1, 2 and 3. Six bows with slats running lengthwise complete the frame work for the top. The whole is now covered with canvas. Curtains are also put on the sides and back, and so made that they can be rolled up and fastened close to the top when not needed. The end gate is equipped with a ratchet lock for letting it down when loading, or to stand straight out, as shown by dotted lines in Fig. 1, when hauling goods over ordinary length.

The most difficult part of the iron work is on the running gear and making the brake. The accompanying engravings, Figs. 5, 6, 7, 8 and 9, show to advantage the construction of the woodwork for the front gear. The hounds are made in one piece. The fork for the pole being sawed out, a piece of band iron is fitted on the inside, to keep the pole from wearing on the wood. A heavy plate is also fastened on the bottom of the hounds. This iron is made of 2 by $\frac{5}{8}$-inch stock and bent to fit the fork. Then a piece of 3 by $\frac{5}{8}$-inch stock welded at A, Fig. 8, is extended to the rear ends of the hounds. The side hounds also have a plate $1\frac{1}{2}$ by $\frac{1}{2}$ inch laid full length of the bottom side, and further reinforced by a truss-iron, shown in Figs. 1 and 4, at D, making this part of the gear very strong.

The springs are 9-plate for the sides and 10-plate for the cross-springs, and $2\frac{1}{4}$ inches by 40 inches long. The axels are 2 inches, with a 9-inch spindle. The tires are 2 by $\frac{3}{4}$-inch; height of wheels, 36 inches for front and 48 inches for rear. The brake, as will be noticed, is fastened to the rear axel by what may be termed a "jack clip." A lever

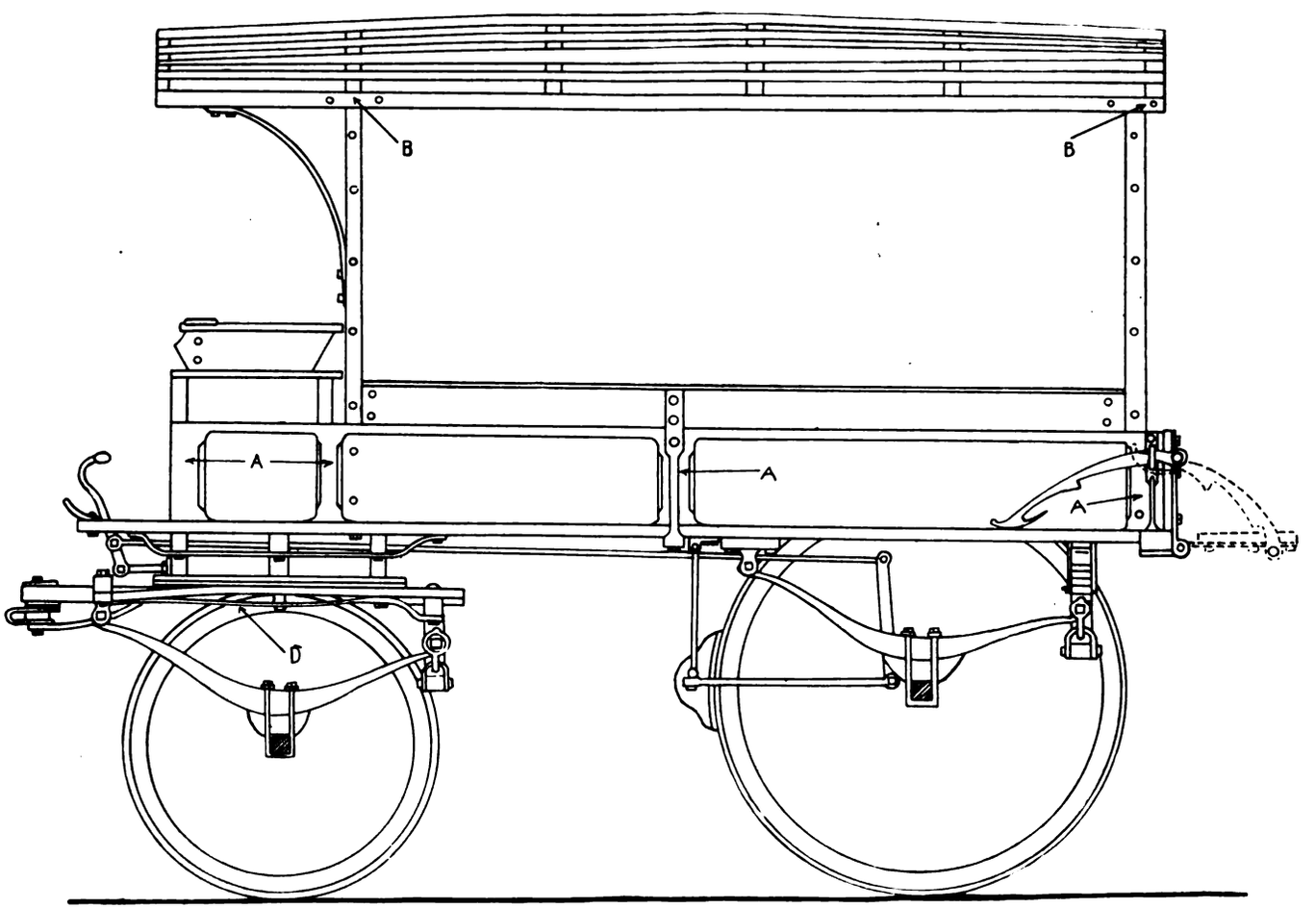


FIG. 1—THE SIDE ELEVATION SHOWS THE PRINCIPAL LINES AS WELL AS THE GENERAL DETAILS

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working into this clip has two rods extending forward to the brake beam. The peculiar advantage of this arrangement is that when the wagon is loaded and the springs go down, the brake-blocks are always held at the same distance from the wheels, thus enabling the driver to set his brake tight. A better idea may be gained of the brake arrangement from the view shown at Fig. 10 in the engraving.

Horseshoes and Horseshoers in the Early Days.

When men first devised plans for protecting the hoofs of horses from damage, they probably made real shoes of braided rushes and of leather, which were put on the horse's feet only in time of need. But, as these soon wore out and the working of metal became easy, the use of iron shoes came into vogue for beasts of burden.

The first were in all probability not nailed to the hoof but so made that they could be easily removed. Catullus, the Roman poet, who wrote in the first century before Christ, refers to the way "the mule leaves her iron shoe in the stiffs and of the slough." In the Old Testament there is reference to horses' hoofs being broken by mighty prancings, showing that they were not protected by metal shoes, but the reference by Homer to "brazen-footed" horses is held by some to refer to brass shoes, although others regard it as mere poetic license.

Mithridates, in his war with the Romans, had to send his cavalry away while besieging Cyzicus because the hoofs of his horses were worn down. The earliest records show that the people of Thessaly were the first to protect the hoofs of their horses' feet with shoes of iron. They were first tied on with thongs, but with the invention of nails, they were used to fasten the hoofs and shoes together.

The Greek name of the modern horseshoe, the shape of the crescent moon, first appears in the works of the Emperor Leo, in the ninth century. These, it is stated, were made of iron and fastened on with nails. Suetonius says that Nero, the emperor whose name is inseparably connected with the burning of Rome, had mules with silver shoes, while the elder pliny says that Nero's notorious queen, Poppea, had her beasts shod with gold. But it is believed that these were not nailed to the hoofs, but the upper part, drawn over the feet, only was made of the precious metal, so as to give a glittering appearance to the hoofs of the animals when they were in motion.

No older nails used in fastening shoes to horses' feet have been found than those believed to have belonged to Childeric I, Emperor of the Franks, who died in 481 A. D. The shoes were fastened with nine nails to each hoof, but no part of the shoe remains. The oldest shoe extant is one which belonged to the Emporer Charlemagne, in the eighth century, in which there are holes for nails.

William the Conqueror is believed to have introduced horseshoes into England, for he gave the City of Northampton as a fief to a man in consideration of his furnishing shoes for his horses, and Henry de Ferrers, who went from Normandy with the king, and whose descendants bear six horseshoes in their arms, was so named because he was in charge of the royal farriers.

At Oakham, the seat of the Earl of Ferrers, the rule, as told in these columns in a former number, was for centuries that who passed through should forfeit one of his horseshoes, unless he redeemed it with a fine. Many shoes were received in this way and hung in the castle.

When Boniface, third duke of Tuscany, went to meet his bride in 1038, it is

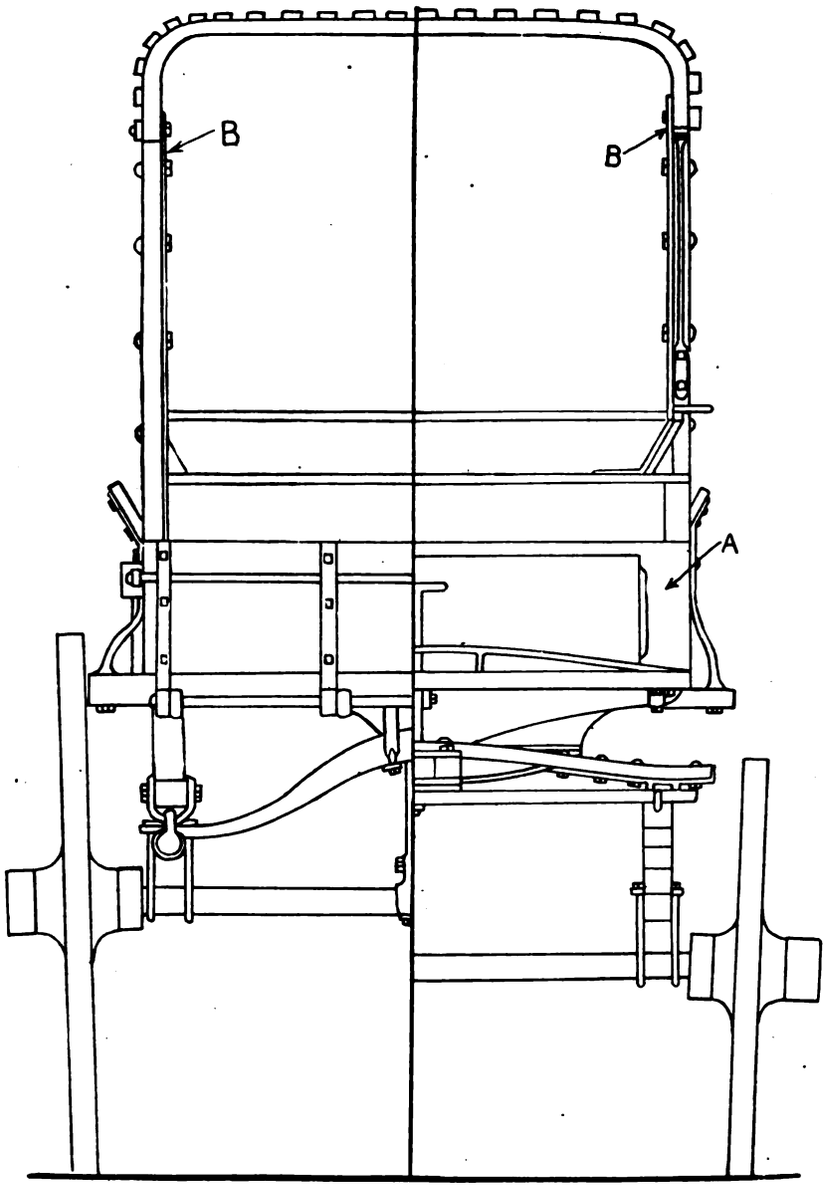
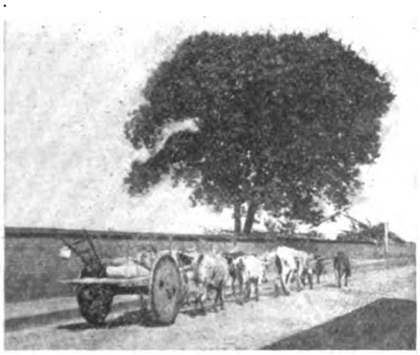


FIG. 3—SHOWS HALF THE REAR ELEVATION

FIG. 2—SHOWS HALF THE FRONT ELEVATION



BULLOCK CARTS WITH SOLID WOODEN WHEELS USED TO TRANSPORT COFFEE IN BRAZIL

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recorded that his train was so magnificently decorated that the horses were shod with silver instead of iron, and silver nails were used, and the duke graciously granted that if any fell out almost wholly supplanted the old-fashioned hand-wrought nail, has contributed largely to lameness of horses, as a machine-made nail is more likely to split when driven into the hoof, and to find a horseshoe, and though 'twas to make myself merry with this fond conceit of the superstitious vulgar I stooped to pick it up."

The nailing of horseshoes over doors

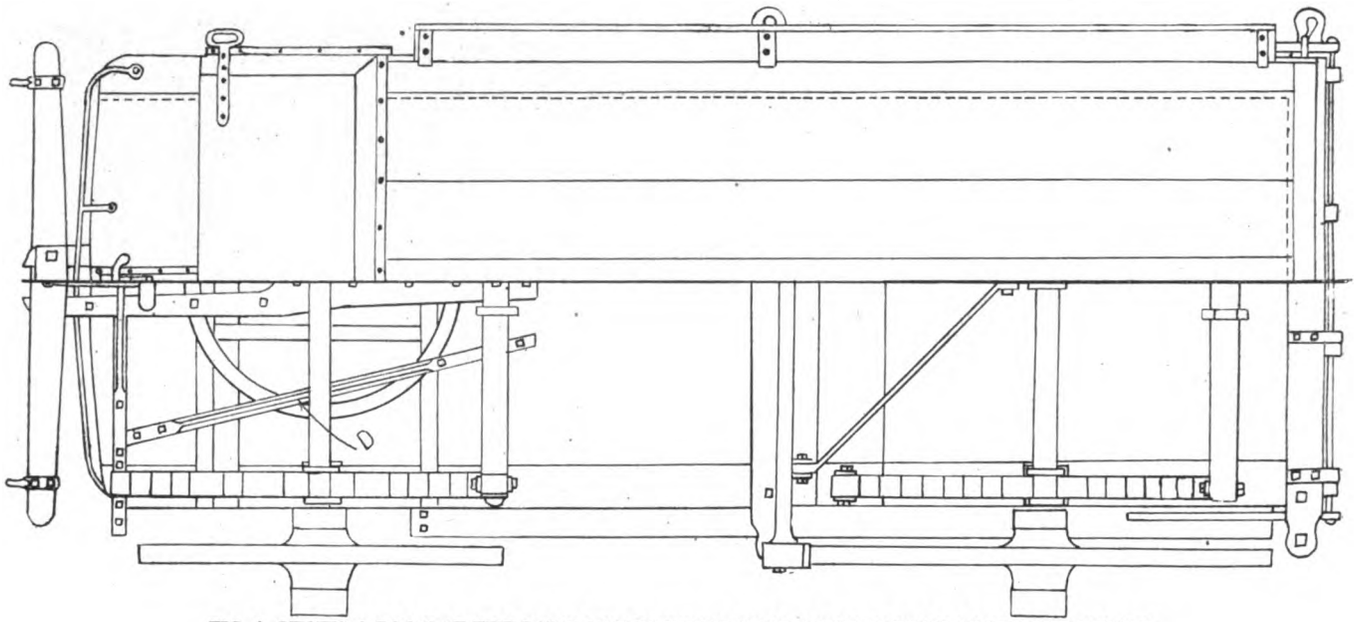
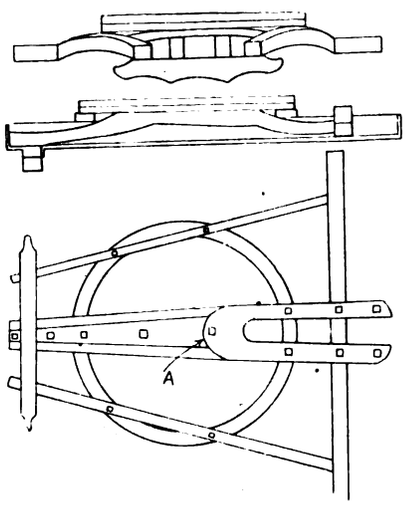


FIG. 4—SHOWS A PLAN OF THE BODY AND RUNNING GEAR AS SEEN FROM ABOVE AND BELOW

they should be the property of those who found them. As late as the sixteenth century an English ambassador in Paris had light silver shoes so fastened on his horse that when the animal pranced the shoes were flung off and the crowd scrambled for them.



FIGS. 6, 7 AND 8 SHOW REAR, FRONT AND BOTTOM VIEWS OF THE FRONT GEAR

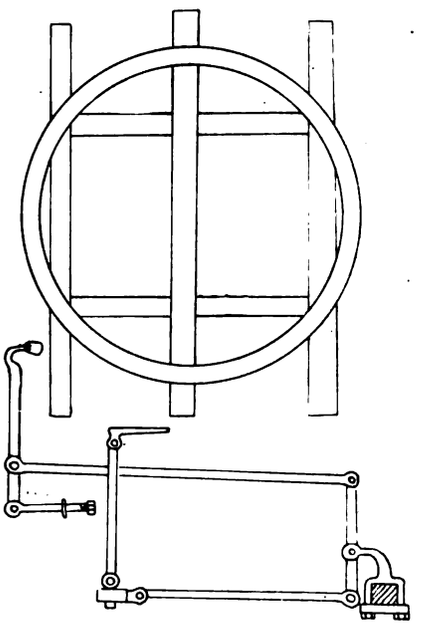
Horseshoeing has been characterized as "one of the penalties which civilization inexorably exacts." Every time a horse is shod, damage is done to the hoof by paring it and putting nail holes in it, and there is constant danger of a nail or a sliver one penetrating into the flesh and causing lameness. It has been said that the making of horseshoe nails by machinery, which was invented in the middle of the last century and has one portion to turn inward and the other outward. We cannot, however, vouch for the absolute truth of this.

No monuments or sculptures are extant showing any horses with shoes earlier than the second century, but a bas-relief in the museum at Avignon is of this date. A coin in the British Museum, from Tarentum, of about 300 B. C. is, however, supposed to represent a shod horse. When the Huns invaded Europe their horses are believed to have been shod, and the Arabs of the Hejira in 622 A. D. shod their steeds.

When horseshoeing first came into vogue the art of the smith was regarded as ranking with that of writing poetry or giving instruction, so that noblemen, bishops and squires, and even kings, did not distain to practice it, and the first smiths were men of high rank. Many noble families have horseshoes in their armorial bearings.

The popular tradition that it is lucky to find a horseshoe has great antiquity, as has the custom of nailing them up for preserving the same good fortune, or as an antidote to ill. In a book written by Dr. Horne in 1650, reference is made to the good luck of finding pieces of iron and the ill luck of finding silver. In Holyday's comedy, "Marriage of the Arts," published in the same century, he writes that the horseshoes may never be pulled from your threshold. In his Reflections, published in 1695, he says:

"The common people of the country have a tradition that 'tis a lucky thing and windows to keep away witches and their malign influence, had great vogue in the days when belief in witchcraft was prevalent. The ancient Romans drove nails in the walls of houses as a protection against plague and, had they known of horseshoes, they doubtless would have nailed them up.

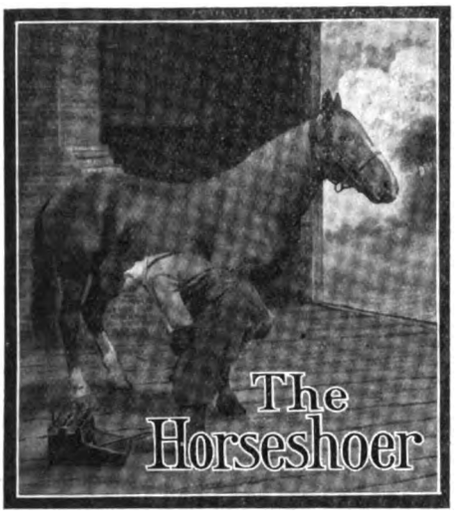


FIGS. 9 AND 10 SHOW A BOTTOM VIEW OF TOP CIRCLE AND GEAR, AND ALSO THE BRAKE ATTACHMENT

In the latter half of the seventeenth century, a writer mentions that most of the houses in the west end of London were protected against witches by horseshoes nailed on them. As late as

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1813 there were seventeen horseshoes nailed up in one London street, but in 1841 only five remained.



Every horseshoer should know something about the anatomy of the horse's foot. He can treat and shoe the animal more intelligently. He will not be so far at sea when an out-of-the-ordinary case comes to him. He will be more "at home" when working on the foot. The apprentice cannot start too young to study the foot, and he cannot study it too long, if he goes about it correctly. S. H. M.

Never lose sight of the purpose of the shoe—to prevent wear of the hoof and to secure a foothold. The wear can be prevented by means of a light shoe as well as a heavy one, and the foothold can be secured with short calks just as well as with long ones. Therefore, use shoes as light as possible, with calks as short as possible. The health of the foot demands that the foot be near the ground and that it carry as little weight as possible. FOX.

Pathological Shoeing.

Its Value in the Treatment of Diseases and Injuries to the Horse's Foot.



E. W. PERRIN.*

One of the difficulties of treating diseases and injuries of the foot, especially those which affect the plantar surface, is to protect the wound from septic poisoning, from dirt, undue pressure and injury. As long as an animal has strength enough to get up he will stand on his feet, even though he be ever so lame. And since manure and urine will collect in a stall at night, though it be kept ever so clean during the day, the problem of keeping a wound in the bottom of the foot clean and free from the irritating acids usually found in stable filth, under ordinary conditions, is a most difficult one to solve.

Making a specialty of the treatment of diseases and injuries to the foot, as I do, I have frequently been confronted with this difficulty of protecting a wound in the sole or frog, and still have it accessible for treatment every day. In the treatment of bad cases of thrush, the main reliance is not so much on some specific drug as it is upon the "never-let-up" application of cleanliness. And you cannot keep a foot clean under ordinary circumstances, either while the animal is at work or standing in the stall. You may wash the foot nice and clean

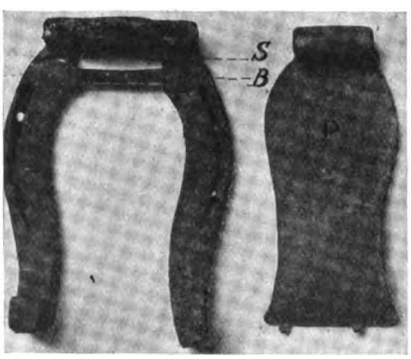


FIG. 2—THE PARTS TO THE HINGE PLATE SHOE

and apply your treatment, but soon as the animal sets his foot down your work is all undone. Again, in injuries resulting in the loss of part of the horny sole or frog, the patient may be convalescent, and even fit to work, long before nature has reproduced the horny covering. So that what we need in such cases, is a pathological shoe—something that will protect the affected part of the hoof or foot while the animal is at work.

About a year ago I had a draft horse with an ugly wound in the heel of a front foot. It made no progress because the animal gnawed it at night. I also had two mules belonging to a transfer company. These animals had serious wounds in the frog, and both these patients were fit for work, while there was not a particle of horn to cover the sensitive frog. Being confronted with these problems, I conceived the idea of a hinged shoe that could be opened up at will, so as to permit getting

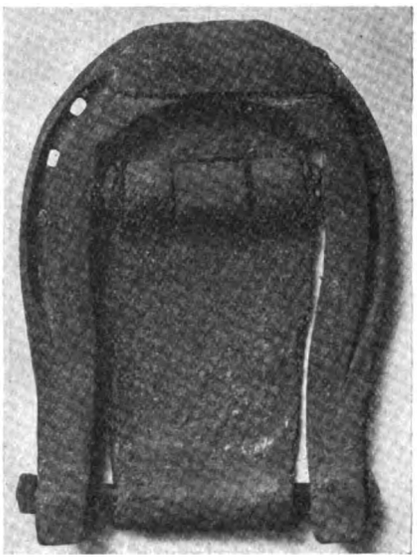


FIG. 1—A HINGE PLATE SHOE AFTER SIX WEEKS' USE

at the wound for treatment. As an experiment I bought an ordinary strap hinge, one half of which I cut short to weld on to the toe of the shoe. The other end I doubled back upon itself, welding to fit the bottom of the shoe. I then turned an eye at the end which fitted in between the heels of the shoe. The other end I welded onto the toe of the shoe. I then punched a hole in each heel of the shoe opposite the eye in the plate, through which I passed a quarter-inch bolt, and the shoe was complete. I then fitted it to the foot and nailed it on, opened up the hinge, dressed the wound, filled the bottom of the foot with absorbent cotton, closed the hinge, put in the bolt and sent the animal to work, with instructions to have him sent to my shop once each day to have the wound dressed. This mule worked three months shod

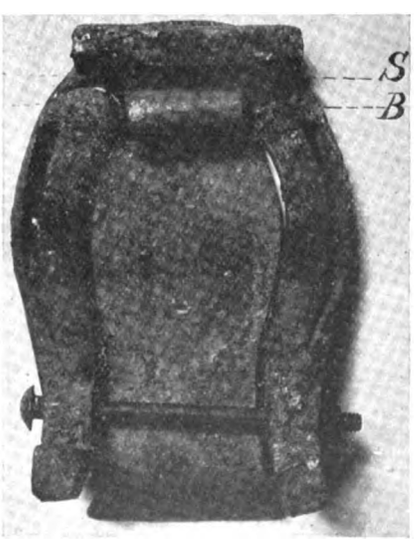


FIG. 3—THE HINGE PLATE SHOE COMPLETE AND ASSEMBLED

* Mr. F. W. Perrin is of English birth and received his training as a horseshoer in the English army. He has contributed largely to daily and class publications in both this country and in England. His articles have appeared in these columns ever since the founding of THE AMERICAN BLACKSMITH. He is now a naturalized American and acknowledged as one of the country's foremost authorities on scientific horseshoeing.

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in this manner. Fig. 1 shows one of her old shoes. You will notice, however, that the butt of the hinge covers up a part of the sole, at the toe;

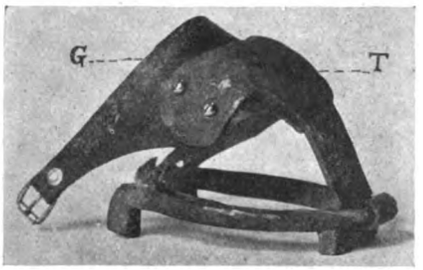
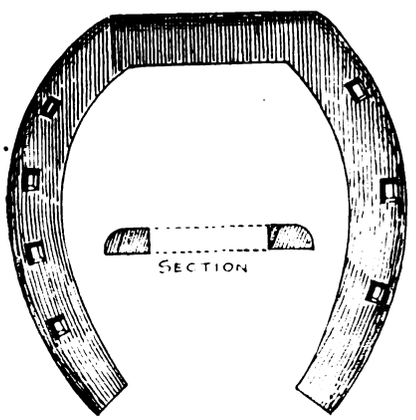


FIG. 4—A SHOE WITH DETACHABLE HINGE PLATE FOR PROTECTION OF THE CORONET

hence a wound in this part was not accessible. I, therefore, thought out another plan, illustrated in Figs. 2 and 3. The base of this shoe is an ordinary machine shoe, made in the following manner: Take a sharp chisel and cut out the web of the shoe close up to the toe-calk and file the slot S, Fig. 2, thus made, smooth. Then weld a piece of five-sixteenth-inch round iron across the toe at B, leaving only sufficient space between toe-calk and round iron to admit of the hinge plate, P, Fig. 2. Now punch one quarter-inch hole in each heel of the shoe, exactly in line. The shoe is now ready to fit to the foot. Take a piece of band iron about an eighth of an inch thick and wide enough to fill the base of the shoe; cut one end the width of the slot, at the toe, and file the edges smooth. Then turn an eye like the butt of a hinge, but do not close it. Leave it open just



A SQUARE-TOED SHOE ROLLED ON ITS ENTIRE OUTER EDGE. REFERRED TO AS X

enough to hook over the five-sixteenth round which forms the pin of the hinge. Now trim the edges of the plate, or hammer it wider, as the case may require, so as to fit it accurately in the base of the shoe. Then cut off the other end a little longer than the heels of the shoe and bend it up to conform accurately to the shape of the frog. The shoe and plate are now complete, and all you have to do is to nail it on, dress the wound, fill up the bottom of the foot with absorbent cotton, insert the plate, press it down and pass the bolt through above it, and screw on the nut (see Fig. 3).

Some months ago I had a mule for treatment with a chronic sore on the front of the coronet of one hind foot. The wound made no progress, and I suspected him of gnawing it. So I tied him up short by day and put a muzzle on him at night. But the bandages were disarranged and the wound stayed sore; so I set a man to watch the patient. He discovered the mule scratching the sore with the opposite hind foot. Here was

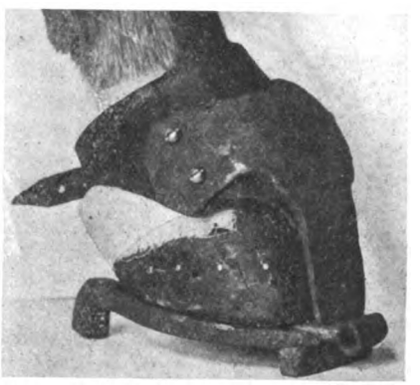


FIG. 5—THE APPEARANCE OF THE SHOE WHEN ATTACHED TO THE HOOF

a case for a pathological shoe—something that would protect the wound from the pressure and rubbing of the opposite hoof. I applied the same idea to the front of the hoof, by welding a square staple on the toe of a shoe, to serve as a pin for a hinged plate, to extend up the front of the hoof. This shoe I nailed on. Then I made a T, Fig. 4, the top of which I forged the exact shape of the part to be protected. In this I punched a few holes for rivets. I then cut a piece of harness leather the shape of G, Fig. 4, with a buckle at one end. This I riveted onto the hinge-plate T. I then hooked the hinge in the staple at the toe of the shoe and buckled the strap around the pastern, as in Fig. 5. This plan was a perfect success.

I have used the same principle to protect a quittor on the coronet, simply by lengthening the plate which fits in the base of the shoe and attaching thereto a piece of leather, blocked to the proper shape, and buckling it in the front of the pastern. I have also used it to protect a badly dropped sole in laminitis. If the point you desire to protect is situated under the web of the shoe, make a bar shoe, and cut out the web at the point to be protected, then fit the plate into it.

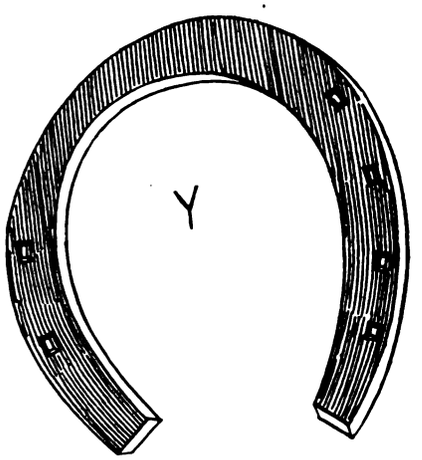
My first care in the treatment of wounds in the foot is to keep the wound in an antiseptic condition; to accomplish this I use my hinge-plate shoe. If there is much pain in the foot, the patient cannot stand the concussion of driving nails. In this case, I punch the nail-holes round; take a gimlet and screw driver and four short wood screws. These hold the shoe on well enough until the animal is sufficiently well to have the shoe secured with nails. The old time leather sole is good in some cases, but useless in all cases where you desire to get at the wound for treatment.

Understand that I am not advising the average horseshoer to attempt the treatment of diseases of the foot where the services of a veterinary surgeon can be obtained, but the veterinary surgeon, in handling such cases, will be glad of the mechanical skill, ingenuity and co-operation of the horseshoer.

Some Practical Pointers for Practical Smiths.

THEODORE MELANCON.

For hoofs that are spongy and grow slowly, I use this with good results: About two pounds of tallow and about two ounces of wax melted. When cold, rub the hoofs well three times a week. This is also very good: Half castor oil and half turpentine, and rub the outside well three times a week.



AS MUCH TOE IS REMOVED FROM THE FRONT SHOE AS POSSIBLE

Here is something I find O. K.: If I have a spring that is too hard to drill, I take a small piece of wax, and after letting the leaf begin to get red, put

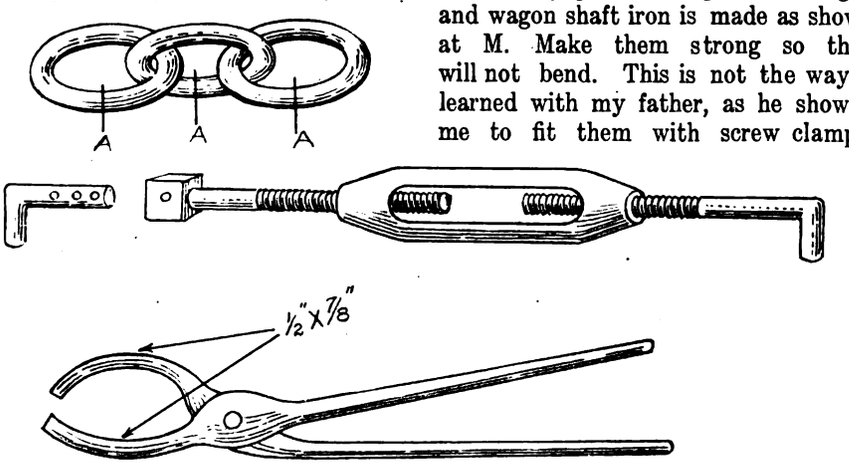
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wax where the hole is wanted. Now let it get cold. Then it is just like a piece of iron. Here is a little trick: We have five pieces of chain of three links each,—how many cuts and welds would you make to put them together? You would make three cuts and three welds, as shown. Cut all three links in the first piece as at A A A. Now take them apart and join the four remaining pieces with one of the cut links, and in this way you join five pieces of chain and make only three cuts and three welds.

Here is a very handy tool: One day I was putting on a 2-inch rim three feet high, and at two or three places I could not get it to touch the spokes. It was nearly $\frac{5}{8}$ out. So I thought I would buy a turnbuckle and fit it so as to catch from hub to rim. You can also make it to use for other work, as for body, etc. I welded a piece of $\frac{3}{8}$ by $1\frac{1}{4}$-inch stock on the end of one stub, and on the other fitted with one hole to a sleeve, to receive a similar piece which contained three holes, so I could make it longer if needed. If needed still longer, we can easily make another piece and bolt it to the end where the hole is. I do not give any dimensions, as each one may make it the length he wants.

The following is something that will interest many, especially all who are like me (who do not know much about arithmetic or how to cut iron needed to make bands or hoops). It is very simple. Three times the diameter and four times the thickness of the band or hoops. Now, I do this way, as I prefer to have it a little smaller than too large. I do not put quite the thickness of iron for the weld. Thus, if it is $\frac{3}{4}$ iron, I add about $\frac{5}{8}$ for the weld. I know that many blacksmiths do not know how long to cut a piece of iron needed to make hoops, but this saves iron and also time. Those who do not know anything about arithmetic can do thus: Suppose they want to make a 4-inch hoop of $\frac{3}{4}$ iron. Take the rule and measure four inches three times. Now, in like manner, measure $\frac{3}{4}$ of an inch three times. Now, as you want $\frac{5}{8}$ for weld, the total length would be 15 inches. Two weeks ago I had to make twelve 4-inch and twelve $4\frac{3}{4}$-inch, and I was glad to know how to cut the length needed.

A handy pair of tongs to fit buggy and wagon shaft iron is made as shown at M. Make them strong so they will not bend. This is not the way I learned with my father, as he showed me to fit them with screw clamps, but with them it goes slow, while the tongs I find are very much quicker.



SEVERAL PRACTICAL HELPS FOR THE PRACTICAL SMITH

For horses that stumble I take an ordinary shoe, beat it round, and square about $1\frac{1}{2}$-inches at the toe. (See X in the engraving). For trotters I use about a 14-ounce front and about an 8-ounce hind; for a forger, a quarter-weight front or toe weight and very high shoe behind. Always take off as much toe as possible in front, and leave as much toe on hind as you possibly can. (See Y in the engraving). For corns, cut all the corn off, then burn it with gum camphor. If the corn is rotten, cut it down and burn it with carbolic and turpentine, $\frac{3}{4}$ turpentine, $\frac{1}{4}$ carbolic acid.



THE SHOEING OF AN OX IS AN EXCEPTIONAL CASE FOR THE CITY HORSESHOER

An Indianapolis Smith Shoes an Ox.

The principal street attraction in Indianapolis, a while ago, was an old man driving a big red steer to a rickety old wagon. It has been years since this style of transportation has been seen on the streets of Indianapolis. The driver gave his name as James Russel Van Gundy, and said he was on his way from Chillicothe, Ohio, to western Kansas, where he hoped to find a home. Mr. Van Gundy, finding that his steer needed shoeing, stopped at Fells & Abrams' smithshop, on East Washington street. He told the smiths a hard-luck story, and they told him to bring in the animal and they would shoe him for nothing. This, of course, was pleasing information for the owner of the steer, and he soon had the animal chained to a post in the smithshop. After examining the feet of the steer, Harry Fells soon turned out a set of shoes of the required shape, and his partner, Mr. Abrams, attempted to attach them

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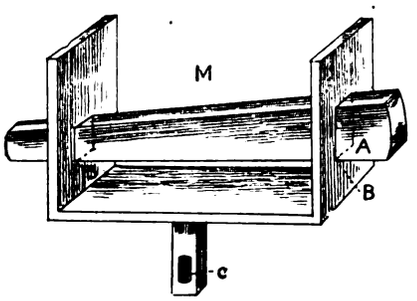
The steer did not enjoy this operation, or perhaps he didn't like the shoes; but, whatever his reason, he gave every evidence that something was not exactly to his liking. Brother Abrams has had experience with mules, and also western ponies. but admitted that the steer took the prize as a case of difficult shoeing. Finally, after considerable kicking, jumping and bucking, on the part of the steer, brother Abrams succeeded in attaching the shoes.

Several Practical Hints.

C. W. METCALF.

Here are a few practical pointers I wish to give to my brother craftsmen: M is a very simple tool for holding flat stock when forming an angle. In the first place, take a piece of flat stock the width of the anvil by one half or $\frac{5}{8}$ of an inch, and weld on a square shank to fit the hardy-hole. Now bend each end at right angles, to fit any width stock you desire. Then make two slots, as shown at BB, and make a key or wedge, as you may call it, as at A. Now drill a hole in the shank, as at C, to take a key and hold the tool solidly. You now have a handy tool for lots of work.

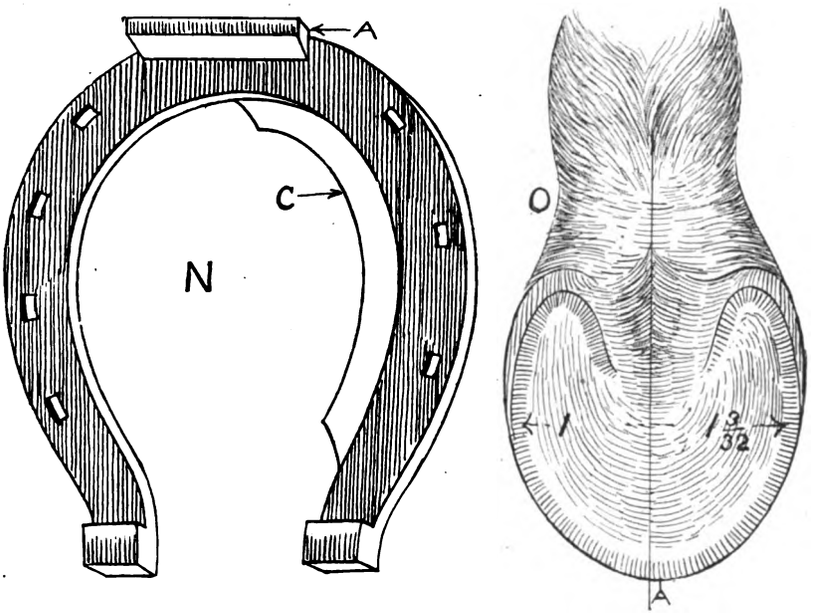
N is a front shoe for interfering. I generally use a common shoe and,



EASILY MADE AND VERY HANDY FOR HOLDING FLAT STOCK

if the animal breaks over on the outside, I set my calk as at A, to project beyond the shoe. If I don't get it right at first, the next time I shove it a little further. If the animal is inclined to throw his foot on a swing, I give a little side weight, as at C. If this is not satisfactory give the rear calk, on the side on which he breaks over, a little trailer. I think you have completed the job.

At O, you will find the bottom view of a horse's foot. You will discover that a line drawn directly in the center of the frog to the toe, will come to one side of the center of toe by an $\frac{1}{8}$ of an inch. And across the base you have got one inch on one side and $1\frac{3}{32}$ inches on the other side. Now, can you see the point I am driving at? If not, I will explain as near as possible. Some smiths say to set the shoe square with the foot. Now, you fit a shoe and place it on this foot, so a line drawn



A SHOE TO CURE INTERFERING AND A PLAN OF THE FOOT TO SHOW HOW TO SET THE SHOE LEVEL

through the center of the frog will strike the center of your toe-calk, and have your heel-calks in their right position. Would you have your shoe square with the foot? I think not. If you set a shoe straight with the foot, then you stand in front of your horse and you will see that you have your toe-calk at least $\frac{1}{8}$ to $\frac{1}{4}$ of an inch to one side of the center of the foot, at the toe. If you notice, you will find on the front of the foot, from the coronet band to the toe, there are lines to indicate the center of the foot. Therefore, I say, find the center of your foot and set your shoe accordingly, regardless of the frog. I would like to hear from someone else who is a little more experienced than myself. I have had only 25 years of experience, and I may be wrong.

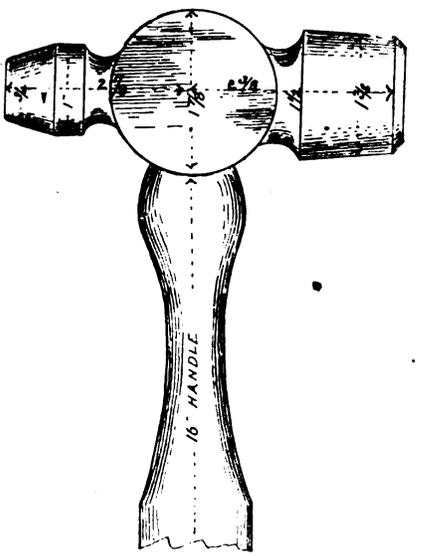
A little secret I would like to give my brother craftsmen is a hammer of my style of make. It is as perfect a hammer as a man ever swung. The engraving gives all the measurements. I have used it the past year, and have had more solid comfort with it than any hammer that I ever used and, therefore, I would give it to those who would like to have a good hammer. The only fault is that you will have to keep your eye on it.

Figuring Horse Power.

M. BECK, CHIEF ENGINEER ALMO MFG. CO.

One so often hears of the amount of work that a certain size and make of steam or gas engine will do, or a certain horse or pair of horses, that there is danger in losing sight of the fact that a horse-power refers to the rate at which work is done, and is not an amount fixed by the engine or team under discussion.

When the rate of work which should be considered a horse power was set, it was considered at that time to be the rate at which an average horse could work continuously, without undue fatigue, and was not the maximum amount which the horse could do. Whether this was rightly set at the time, or whether it is right relative to the horse at the present time, is not a subject for



THE DIMENSIONS FOR MAKING A GOOD HAMMER

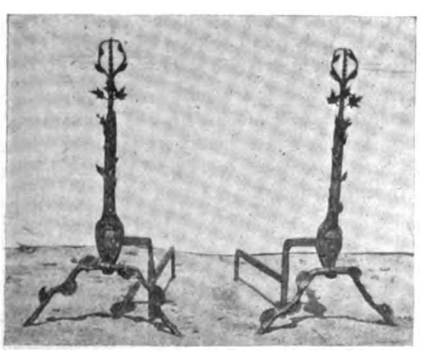
discussion. It is a certain fixed measure of the rate of work, just as the foot is a measure of length, or the pound a measure of weight.

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To get the proper understanding of what a mechanical horse power is, it is necessary first to get an understanding of the expression "foot-pounds." Primarily, engines were used almost exclusively to raise water out of mines, and the work done was rated at so many pounds raised so high. If the water was raised 100 feet, the work done on each pound of water pumped out or raised was said to be 100 foot-pounds. Ten pounds of water raised to that height would represent 1,000 foot-pounds. If the water was raised only 50 feet, it would require only 500 foot-pounds of energy to be expended. The foot-pound is the number of pounds raised, multiplied by the height to which it is raised, and one pound raised 10 feet requires the same expenditure of work, or energy, as 10 pounds raised one foot.

The standard horse-power is 33,000 foot-pounds per minute, and represents any number of pounds raised in one minute to such a height that, when the height in feet is multiplied by the pounds, it will equal 33,000. Any work equivalent to this is a horse power. Take, for example, the raising of water, coal or ore from a mine. If it were raised by a cable, the tension on the cable would equal the weight being raised, and this, multiplied by the number of feet it was raised per minute, would give the number of foot-pounds per minute, or the rate at which the work was being done. This amount divided by 33,000 would give the horse power being expended at that time, since 33,000 foot-pounds per minute equals one horse power.

From this it is easy to get a comparison in one's mind between the cable and a belt or chain, the only difference being that the belt is endless and runs continuously, usually in one direction and at a constant speed. If the tension, in pounds, of the tight or driving side of a belt is multiplied by the speed of the belt, in feet, per minute, it will represent the horse-power being transmitted. The speed of a belt is found by multiplying the circumference in feet of the pulley by the number of revolutions which it runs per minute. If one were to double the circumference of the pulley and keep the revolutions per minute, and the belt pull the same, it would double the power. Any change in either speed or pull of belt makes a like change in the power.



A SET OF ANDIRONS OF ORIGINAL DESIGN

A Set of Andirons of Original Design.

The set of andirons shown in the accompanying engraving were executed by Mr. E. C. Johnson of Massachusetts. The set is artistic, shows much originality and a carefulness of detail on the part of the smith. Mr. Johnson, while making a specialty of gunsmithing has a hobby of forging fine and intricate parts and this set of andirons is one of the results of his hobby moments.

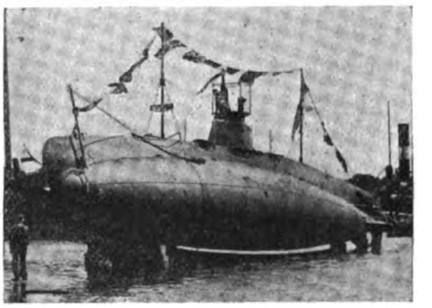


"I thought your January number was going to be a special," said Benton, looking over the proof sheets of the first copy for 1907. "Nothing special about this," he continued. "Same number of reading pages, same heading cuts, same general make-up and everything about the same, as far as I can see. I expected to see a special colored edition or something on that order." Then finding the Editor paid no attention to him, Benton said: "Of course, you've got an excellent paper here, but then that's what you always have."

"This issue," returned the Editor, picking up the sheets, "is a special only because of its double circulation; the paper in other respects is the same." Then, turning the pages, he continued: "Have you noticed what a fine paper we have here? And every one to follow is going to be just as good or better. Nothing cheap for 'Our Folks'—they deserve the best there is and lots of it, and we're giving it to them in the best smith paper that it is possible to print."

"That's pretty strong talk," returned the other.

"I know it is," replied the Editor, "but when you realize the amount of sound, practical information a subscriber receives



SUBMARINE BOAT "CUTTLEFISH"—LAUNCHED SEPT. 1ST, 1906. ANOTHER CLASS OF WORK FOR THE SMITH

in a year you, too, will be strong in your praise. Just think for a minute, Benton! We give a man twenty-four pages of practical information every month, or 288 pages a year, every page filled solidly with sound, practical information. Besides all this, we give the subscriber all the pink buffalo stamps he needs. These secure for him fair treatment, and, in many cases, better prices. Then we invite him to ask all the questions he desires on craft topics, and to tell us what articles he would like to see treated in our columns. And these are only the principal advantages connected with a subscription to THE AMERICAN BLACKSMITH."

"Well, you certainly give a smith his money's worth, and I cannot see how you can prevent your list of readers from mounting up to and past the fifty thousand mark."

"That's what's going to happen this year," returned the Editor. "We're asking every present reader to secure at least one new subscriber during the next year, and I believe it can be done. Our subscribers know that we are giving them an excellent paper and are accordingly willing to swell our list of readers."

"You seem to have lots of confidence in your readers," smiled Benton.

"I certainly have," returned the Editor sharply, "I know them."

Joyce made his appearance at this point. "I've got a slippery belt at the shop," said he, addressing Benton, "and I want to to know how to fix it."

Benton pulled out his well-worn receipt book and, after a considerable hunt, read: "Belts—to prevent slipping apply common soap to the running belt or use rosin and machine oil. Melt the rosin and oil together slowly, using very little oil and stirring thoroughly together."

"About what proportions of oil and rosin do you use?" asked Joyce.

"It doesn't say," replied Benton "but I should think very little would do."

"Here's another thing," returned Joyce, "I've been troubled considerably with loose tool handles. I've wedged and hammered until I'm tired. There certainly must be something to keep the tools in."

"Just take some powered rosin," replied Benton, "and pour your tool-handle full of it. Then heat the tang of your tool to a red, and, force it into the handle. This will hold as long as the tool lasts."

The boy then entered with several preliminary copies of the January number and all were too absorbed to enter into further discourse.

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Sorrows of a Middle-Aged Man.

JOHN DONNELLY.

The following lines were suggested to me by an old blacksmith who called here in search of work. He had worked twenty years for a New York firm who discharged him because he was too old.

For thirty years a blacksmith, now I'm
sadly broken down.
What hair remains upon my head, is white,
it once was brown.
I've found out by inquiring all over this
broad land
That there's no vacant place just now for a
middle-aged man.

For twenty years most faithfully I worked
for Jones and Co.
One day they notified me that I would have
to go.
"You are getting along in years," they
said, "of course you understand
Your duties can't be properly done by
a middle-aged man."

Since then I've hunted for a job, I've
been most everywhere.
When I ask for work they note my age
and the color of my hair,
And say, "You would not suit this job—
we need another hand—
But have no vacant place just now for
a middle-aged man."

Were I to advise a youth I'd say, "Do
what I've left undone.
The things you should not do, alas, I've
done them every one
And, consequently, as you see I'm poor and
weak and wan,
I hope you'll tell a different tale when a
middle-aged man."



Have you stopped dating your letters 1906?

There's always a hitch when you tie a horse.

Perseverance is good—but first make sure you're on the right track.

Any fault-finding customers? With whom does the trouble lie?

Like a Christmas without a dinner is the smith without a craft journal.

A reputation for good, honest work. Get it. Keep it. Worth money.

Discontent is the blast of reproach that refuses to let the fire of energy die.

"Not near enough brooms worn out in the smith shops," says Thornton.

Procrastination is a painfully plentiful, but exceedingly expensive commodity.

Men who fear for the future don't know that their future is being made now.

Cultivate a smile. Good humor goes for much in all affairs of men and money.

Proper care will save buying new tools, but don't hang on to the old ones too long.

Treat your customer with tact when he thinks he knows more about it than you do.

A business grows only when pushed. Keeping everlastingly at it brings results.

Getting all the business you might have? Always room to expand if you're located right.

Our mission is to solve your craft perplexities. Ask questions on smithing problems.

"Luck? Yes, I believe in it, " said Thornton, "but I always start to spell it with a P."

The Krupp works of Germany, at their iron works and coal mines, employ over 62,000 persons.

A good time to install system is now, then carefully follow it through the year, and note results.

Money in pocket. We refer to the longtime rates. And our life rate is a good investment, too.

The secretary is ready to give you every assistance—ask him today how you may form a county association.

Start your neighbor on the road to a Happy New Year by getting him to subscribe to Our Journal now.

Be up and doing—nothing worth while was ever accomplished without effort, and better prices are no exception.

It's a good thing to look ahead, to be prepared for what may come. Foresight is better than hindsight always.

Worry your competitor by attracting all the best trade to your shop. How to do it—that's your problem. Study it.

Lots of smiths add to their profits by clipping horses. Take the hint before your competitor steals a march on you.

Few men reflect how important it is in any business to watch the many small expenses—to keep the leaks stopped up.

What steps have you taken to better prices in your locality? Supplies are higher and prices for work will not raise themselves.

Brush up on your branch of the trade by reading good craft books. These long winter evenings present an excellent opportunity.

"No great loss without some small gain" said Tom Tardy as he viewed his fallen shop-roof and thought of the good fire-wood it would make.

A post card requesting us to send a sample copy of this paper free to a friend, will have immediate attention. 'Twill help him; 'twill help us.

Speaking of resolutions at this new year season, it's far better to make one small resolution and keep it, than a dozen big ones and break them all.

Do it now. No business man ever achieved more than half success, who did not have those three words constantly before him. In your work be the driver rather than the driven.

"Buy close, sell at a good price, collect every penny when due.—There's a line of conduct that will nourish the pocketbook, and bring satisfaction to him who follows it.

The older a debt the harder to collect. How much have you standing out? You know bills can be collected when due, without offending the customer, if you go at it right.

Pig iron, fifty-three million tons of it, was the world's output last year. Of this the United States produced 22,992,000 tons; Germany, 10,700,000, and Great Britain 9,593,000 tons.

A good thing to know these days: To cut a pane of glass, moisten it with turpentine or vinegar where it is to be cut. Then, with a broken piece of triangular file, proceed as with a diamond tool.

"Reading maketh a full man," runs an old proverb. And did you ever stop to think that you can get new ideas, and by ear or eye? Reading enables you to get knowledge from a hundred men—to every one that talking puts you in touch with.

How long will you be content to sit and read what the other fellow writes for these pages? Have you nothing to say? Surely you don't agree with all the opinions advanced. Then join the discussion and let us have that article, long or short, you have been going to write for so long.

"Good morning! Have you used chloride of calcium? It's a freezing cold day," said the fly wheel to the water jackets "Yes, it makes my teeth chatter," spoke up the gear wheel. "For my part, I'm glad of the change; the heat always goes to my head," remarked the cylinder. "Well, between a crank on one side of me and a cross head on the other, I always have said my lot is worst of all," the connecting rod growled. Just then a ring from the piston warned of the bosses' approach, the valves quickly resumed their seats, and all was quiet in the engine room.

The steel trade of Sheffield, England, is reported as very active. Calls for high-speed steel are increasing, and the requirements of American customers are described as "phenomenal." It is roughly estimated that not less than 100 tons of this steel is sent to the United States every week. The significance of this fact will be more apparent when it is added that the prices vary from 28 to 97 cents per pound, and the demand is mainly on the better qualities. While American manufacturers were the first to put this steel on the market, they have allowed the enterprising firms of Sheffield to practically run away with the trade. A local maker explains this by saying that the Americans cannot make high-speed steel equal to the Sheffield. Another theory current in Sheffield is that the American maker realizes that the general use of high-speed drills would enormously reduce the consumption of ordinary carbon-steel drills, of which the Americans are the largest producers. Whether this is the case or not, it would seem failing in its purpose when it allows

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the trade of one city in one item alone to advance from $830,624 for six months of 1905 to $1,351,284 for the corresponding period in 1906.

Manual Training for the Small Manufacturing Town.

Public spirited men will find a good suggestion in the article on page 65, describing the manual training school, of Brantford, Ontario. What better solution to the apprentice question? What better time to train the future skilled workmen?

There are towns almost without number that could adopt the Brantford idea to advantage; towns given principally to manufacturing, where the apprentice problem is the burning question, and where the factory takes the boy out of school long before his time. The advantages of such a school, to the future citizens in general, are almost unlimited and such institutions, it will be readily admitted, may become powerful factors in placing the smithing craft in its rightful position among world industries.

Costs Have Advanced.

The past few years have seen marked advances in the cost of supplies and living expenses, 'till they are now at a higher point than they have been for many a year. Have your prices been raised accordingly? If not, your percentage of profit has grown less and less. as costs have advanced. Supplies of all kinds are from 20 to 25% higher than ten years ago. And not only have these advances affected the supplies for the shop, but the home also has felt it. Unless you have met this raise by a similar advance in your own prices, the present wave of prosperity in this country means hard times for you.

The advances have been so gradual that the smith is prone to absorb them himself, and not impose them upon his customers. There is, however, a limit to this practice, for the advances in this case have been so continued and on the whole, so marked, as to cut into the smith's profits very deeply.

There is, therefore, a call for an advance in your prices, if you have not already met the raise in costs, and the sooner steps are taken to make your percentage of profit what it should be, the better for your business.

The advances in costs are a just and legitimate ground for your charging more for your work, and form the best reason you can give your customers for raising your prices. And, if the customer complains that he can get the same job done cheaper elsewhere, your best argument is that poorer work may be done cheaper, but not high-grade work similar to the kind you do.

The Government Horseshoer.

In a recent letter, one of our correspondents speaks especially of the low wage paid to the horseshoer in the cavalry and artillery branches of the United States government service. He says: "There are many horseshoers who do not earn high wages because they don't know enough to do good and proper work. And, incidentally, the war department helps to turn out a good many of this class. A soldier, for instance, claims he knows how to shoe horses. He is placed in a shop, and is left to himself as long as he keeps the horses shod. Naturally, he falls into some very bad habits in shoeing. After this man has shod the army horses for about two years, he goes out in civil life a full-fledged horseshoer (?). He cannot do a good job, except on the floor, and naturally works cheap in order to make a living, depriving a horseshoer who has served his apprenticeship of an otherwise good paying position."

The wage paid the horseshoer in the cavalry and artillery is $15.00 per month, and, naturally, the government cannot, except in a few cases, expect to secure the services of good shoers. Were a higher wage offered, more shoers of greater skill would enlist, raising the standard accordingly. Many horses are condemned every year because of having been poorly shod, and because the government prefers, generally, soldier-made shoers.

We understand that the war department has established a school for horseshoers, at Fort Riley, Kansas. Here soldiers take a course of instructions lasting some six months. This is a step in the right direction, but it is hardly necessary to say that horseshoeing cannot be learned in this short time. The solution of the problem of better horseshoers for the government service is to offer such inducements as to make it worth the while of the good men of the craft to enlist in the service.

American Association of Blacksmiths and Horseshoers.

At the rate with which we are starting, the new year promises to be the best ever in association circles. The number of requests for plans, the number of associations actually formed, and the number of movements started, is indeed most gratifying. Space, this month, does not permit of our enumerating all of the association happenings within the past few weeks. Suffice it to say that while the secretary is well occupied, he is very anxious to co-operate with those smiths who are located in countries not enjoying the advantages of an association. Let us get busy in your county now, while the smiths are easily convinced of the advantages of organization. Let me know the conditions of your county. Are you getting the prices you deserve? Do the smiths uphold one standard of prices? Are you and your brother craftsmen organized? Are you protected against the "dead beat?" If you cannot answer these questions with a "Yes," write me today without further hesitation. You will need to organize to secure these advantages. If there were a simpler method of accomplishing these reforms, I would recommend it. Organiaztion, without question, is the only solution to every craft problem. Better prices is only one of the many problems which it can answer.

But action is needed—good, brisk, hustling action. Start by addressing a postal to me to-day. Simply say that you desire my easy plans for forming branch associations and, by return mail and without cost to you, will come directions for securing the required reforms in your county. Remember to address me, The American Association of Blacksmiths and Horseshoers, P. O. Box 974, Buffalo, N. Y. Do it now before you forget it. It will pay you to lay the paper aside for a moment.

THE SECRETARY.

Five Recipes for Tempering Mill Picks.

WM. RING.

We don't have any mill picks in this country, but I have the receipts and, therefore, give them for the benefit of the craft.

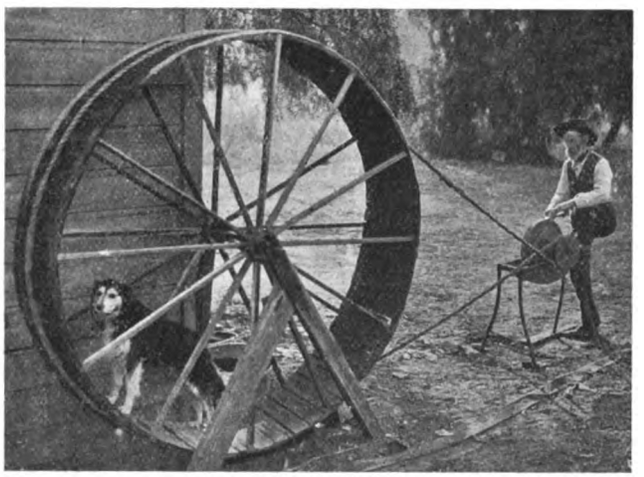
(1) To six quarts of soft water add pulverized corrosive sublimate 1 ounce and two handsful of common salt; when dissolved it is ready for use. Some think it better to add 2 ounces of salammoniac to the above. Heat to cherry red, plunge, and don't draw any temper.

(2) Salt, ½ teacupful; saltpetre, ½ ounce; one teaspoonful pulverized alum; one gallon soft water; don't heat above cherry red nor draw any temper.

(3) Saltpetre, salammoniac and alum, 2 ounces of each; salt 1½ pounds; water, 3 gallons. Cherry red and draw no temper.

(4) Mill pick and saw gummers

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SMITH SHOPS ARE RUN BY WIND, WATER, HORSE, GAS AND ELECTRIC POWER, BUT THE DOG MOTOR HAS NOT YET INVADED SMITHING CIRCLES

Saltpetre and alum, 2 ounces of each; salammoniac, ½ ounce; salt, 1½ pounds; soft water, 3 gallons. Cherry red, draw no temper.

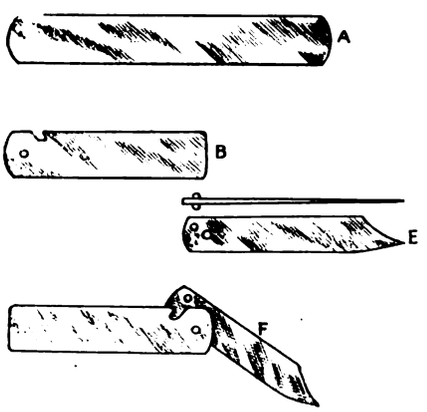
(5) Water, 3 gallons; salt, 2 quarts; salammoniac and saltpetre, 2 ounces of each; ashes from white ash bark one shovel, which causes picks to scale clean and white as silver.

Don't heat too high nor hammer too cold; avoid flaws and don't heat more than one or two inches of pick when tempering. Keep all of these solutions covered when they are not in use, as they are deadly poison.

How to Make Pocket Knives.

H. B. FARTHING.

In the first place let me say that they look somewhat crude, but if well made they are very serviceable. To make the handle, take a piece of ⅜-inch round iron and flatten out a piece (A) about nine inches long and



SIMPLE, BUT A CHANCE FOR EXTRA PROFIT

¾ of an inch wide. Then bend it double (B) till there is just sufficient room for the blade to go in between. Now bore the rivet hole and you are ready to make the blade. Old files make very good blades, but most of the blades I make are of old hay-rake teeth. These are about ⅜ of an inch thick. I flatten out and shape roughly, then cut off a piece for a blade and anneal it. I do this by heating red and burying it in warm wood ashes till it cools. Then it drills easily and you can grind it down nearly to a finish. You want two holes in the blade, one for the rivet on which the blade turns, the other to receive a rivet which is to act as a stop when the knife is open. Drill the one for the stop as near the back corner as possible (see E in the engraving). Then you need not file the slot in the handle so deep. I don't pretend to be able to tell you how to temper very much, as it seems to me it depends very much on the steel you use. The way I do with the blades I make out of hay-rake teeth, is to heat them red, then let them cool in the air till the red just goes off, and then chill them in water. This gives a very good temper. I think this is about all I need to say, as you can see from the engravings how to make these knives.

A Handy Buckle for the Leather Apron.

GEORGE NABLO.

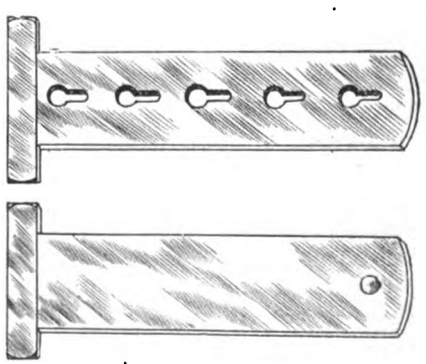
The accompanying engraving shows a set of apron buckles which I think every craftsman will find exceptionally handy and convenient. My father used a set of buckles of this kind while traveling as a journeyman blacksmith in France. I am using his set of buckles now, and they are still good and serviceable. There is little to be said about the making of these buckles, as the engraving is quite clear as to their shape and working. Steel hoop-iron is good stock from which to make them, but brass or copper plate will make a handsomer set.

A Home-Made Machine for All Work.

DAYTON O. SHAW.
(Prize Contest).

I have often been handicapped in my work in repair shops for the want of something to hold heavy work while it is being put in shape with the sledge-hammer. After turning a two-throw crank shaft made from one and three-fourths-inch square stock I resolved to have something of this kind, and this machine is the product of that resolution. Of course it is easy to make a former for one kind of work, but where there are not two jobs the same size, there must be something adjustable to meet the conditions. I will not attempt to tell of the many things I use this machine for, but will give an illustration of a few. With the exception of the anvil, I use it more than any tool in the shop. There is a chance to improve upon it yet, but it works so nicely I have not given that much thought. These pictures were taken at the back door of the smith shop. This machine is no toy. The casting is 20 inches square and four and one-half inches thick, and weighs 400 pounds, without the blocks. The ways in the casting are eight inches long, two inches wide and two inches deep. In the center of the ways is a one-half-inch slot that goes through the casting. A bolt slides in this slot and goes up through the block, and can be set tight when in position. The ways are planed inside, and the blocks planed to fit. The top and bottom of the casting are also planed, and are handy for use as a platen.

To demonstrate let us begin with the crank-shaft. At the time the picture was taken, I had no forgings on hand; in fact there is generally one or two men waiting to take a job as soon as I get it done; so I use a broken crank to show how it is done. This crank was forged on the anvil; it was made in two parts and welded in the center. I made one to replace it. I made it in one piece and worked the corners up square. In



A HANDY APRON FASTENING

making a crank of this size, it would not help the smith just to bend the work to a right angle, as he has to work his corners up square, for there will be a little nick on the inside, and when he gets his corners out he will have a bad cold shut. You will notice in the

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FIG. 1—THE CRANK IS HELD FIRMLY WHILE BEING WELDED



FIG 3—THE BENDING OF CIRCLES IS SIMPLE



FIG 2.—ANGLE IRONS CAN BE BENT CONVENIENTLY

picture that there are two key-ways; the first is to hold the work to bend an angle, and the second is for backing up for a square corner. The first act is to set the head-block the right distance for your throw and make it fast. This block is not changed in making the crank. Now heat your steel and use the first key-way to bend your angle. This is done at one heat. I use a long neck flatter that comes out over the casting to bring up square against the running block. Next, heat in the corner as hot as you can without injury to the steel, put it back the same as you took it out, and drive your first key. Then have a piece of iron one inch thick and six inches long to run along your work, and have one end against the head-block. Drive the second key, and your work is all boxed in except the top. Now back up on the end, as seen in the engraving, Fig. 1, with two helpers. This can be done at one heat. Near the corner it will be a little larger than the original bar. This can be flattened down on the anvil at the same heat if desired; but if left, it gives larger shoulders or cheeks. You can follow this method around every corner, and if the stock is one and three-quarters inches, the wrist pins can be made two inches, and again the little nick we spoke of on the inside, that would spoil the work on the anvil, does no harm here. In upsetting in this double key-way the outside corner falls out and the inside does the same, so that when the corner is full it is solid; and, another advantage, you can commence on the end of a bar and make as many throws as you wish without welding.

Engraving No. 2 shows the boys bending angle irons. There is a gauge that can be attached which I forgot to put into the picture. I use it for long hangers. Set the gauge the right length, heat your iron, run it up to the gauge, drive the key, bring the iron around, knock out the key and you are ready for another. Sometimes when there are two angles close together I set the head-block, and make both at one heat.

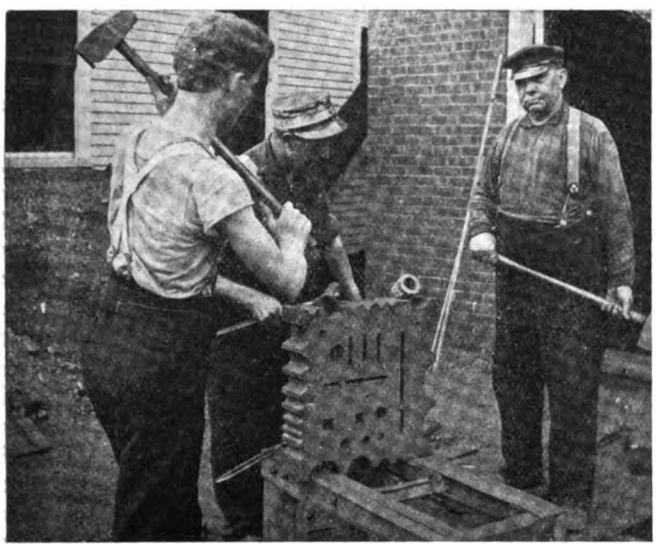


FIG. 4—THE SWAGING OF A CYLINDER IS EASILY ACCOMPLISHED



FIG. 5—HEXAGONAL NUTS ARE ALSO UPSET ON THIS MACHINE

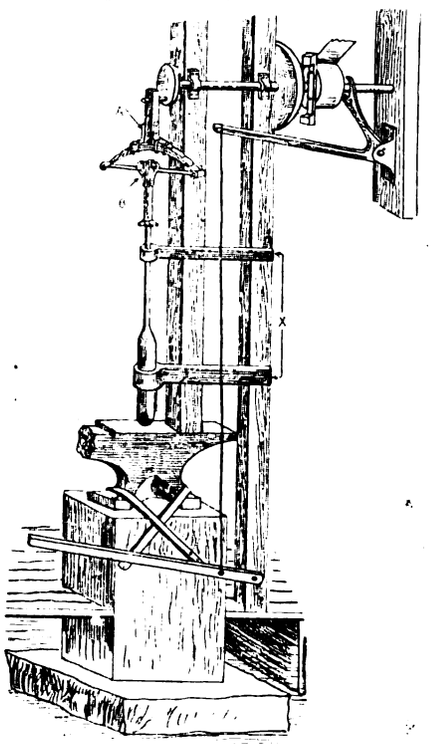


FIG. 6.—THE TURNING OF A LONG SPRING IS AS EASY AS FALLING OFF THE PROVERBIAL LOG

A method of bending half circles for shipper handles is shown in Fig. 3. The swaging of a cylinder is shown in Fig. 4. This cylinder is three and one-fourth inches long, three-fourths inches thick, and two and three-quarters inches in diameter outside. I have to make it larger than this in order to get one half of the length on the horn to weld. Then I change and weld the other end, take a good heat and swage it down to the right size. These swages are made to nearly a half circle, and they form the work nicely. Fig. 5 shows the method of upsetting a hexagonal nut, the hole being too large. These swages are from two and one-half inches down to one-half inch. We often make the large sizes solid and have the hole drilled out and the thread cut.

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Last, but not least, is Fig. 6. In nearly all shops the vise is attached to the bench, and the bench to the wall, so that in turning a long spring the end would strike, but we tip the block down, stand the arbor on end, key it up in the ways, and you can run around like a sailor around a capstan. The engraving shows our method for making a spring fork for a hay tedder. There are swages also for three, five and seven side pieces. I forgot to say that for smaller cranks the blocks can not be wider outside of the casting than the inside of the throw on the crank. I have one set of blocks that are two inches wide in the ways and one and one-half inches outside. Both blocks must be the same width, for they both enter the throw during the construction.



EASILY CONSTRUCTED AND CONVENIENT FOR THE GENERAL SMITH

A Shop-Made Trip-Hammer.

J. S. HOFFMAN.

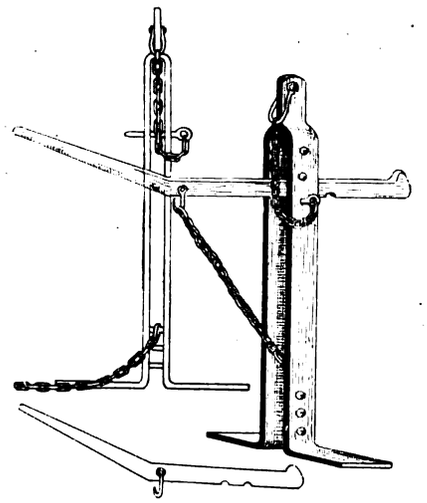
I made this hammer two years ago and it has given perfect satisfaction all this time. I went about its manufacture as follows: After picking out a place for its location, I dug down about three or four feet and placed a large stone. Upon this I erected a good, solid anvil-block, and upon the block I fastened an old anvil which was minus the horn. After securing all solidly, I took two pieces of four by four-inch timber and placed one stick directly behind the anvil, or next to the heel, as shown in the engraving. This piece was fastened solidly to the floor and roof of the shop. The other piece was placed on the anvil, as shown, and run from here to the roof, parallel to the longer piece. I now secured a short shaft and, after placing thereon in the order mentioned a fly-wheel 18 inches in diameter, a good, stout coil spring and a belt pulley, on the end of which was fastened a piece of flat stock bearing on each of its ends a hardwood block, placed it well up on the uprights. I then run a short, stout piece of timber from the roof, to support the pulley end of the shaft. To the other end I now fastened a small fly-wheel which would give me a three-inch stroke. For the hammer I used an old shaft, to one end of which I welded a tool steel face similar in form to the pene end of a sledge. Be careful not to get this too sharp. This shaft should be about 12 or 14 inches long. I then welded on this shaft a piece of good, mild steel, 2½ by ½ inches and about 3½ feet long, or the desired length to reach from the anvil to where the spring will come. For the spring, I used a five-leaf buggy spring, with the long leaf and loops on the outside. Now take two pieces of ¼-inch stock the same width as this spring and bend them as shown at A in the engraving. These are fastened in the center of the spring by means of four clips. The connecting rod then joins the spring to the small fly-wheel. Guides are now placed on the uprights as shown at X, the lower guide being about 10 inches above the anvil. To connect the foot lever with the clutch pulley, forge a Y-rod as at C, and connect it by means of a lever and a rod as shown in the engraving.

A Simple Wagon Jack Easily Made.

J. G. CLOVER, JR.

The accompanying engraving illustrates a very simple wagon jack that is very easily and quickly made. It will sell to your farmer friends at sight, as it is very handy for various purposes.

Take an old wagon tire ½ by 2-inches and cut from it two pieces 2½ feet long. Then bend one end of each piece at right angles. Now cut a piece three inches long from the same stock and rivet it between the upright pieces at the base. Then weld the upper ends together, after making an offset of one-fourth inch in each one, so as to give ample room for your lever. Now drill four or five holes in these upright pieces with your ½-inch drill-bit, and one in the top with a ¼-inch bit. Make a small open link to fit this hole and take a short piece of chain, put a pin to the one end, and fasten the other end to your open link. Now take the same tire and cut off a piece three or four feet long, or longer, according to the load expected to be lifted. Take your fuller and make a couple of notches in this lever, four and six inches from one end, then bend it edgewise and about the middle, so as to not hit the ground when lifting the wagon. Now, fasten a small hook to the lever for catching the chain which is fastened to the bottom of your upright pieces. When the wagon is raised, the chain is hooked and your wagon will remain up. This is a strong jack and you can get from $1.00 to $2.00 for it, according to size.



ANOTHER LITTLE HELP TO BE SOLD TO FARMERS AND TEAMSTERS

There are many little things of this kind which the smith can turn out to



SAMPLES OF WOOD WORK BY MANUAL TRAINING STUDENTS. WOOD WORKERS WILL DO WELL TO TAKE THIS HINT FOR A SIDE-LINE

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advantage during his spare time. The cost is little, and the extra profit comes in very handy, especially during the slack season. Let us hear what others do along this line.

Technical Education in the Small Town.

The Manual Training School at Brantford, Ontario.

C. F. ERRETT.

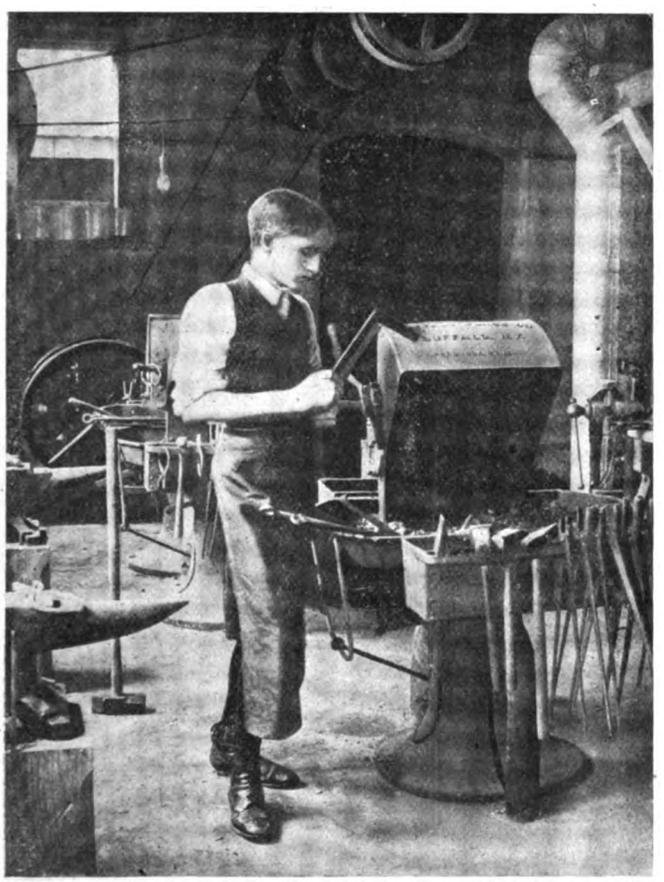
The Manual Training School, of Brantford, has much of interest for all who concern themselves with modern educational problems. It offers a simple solution of how, in a small town, such a practical schooling can be given to boys as will best prepare them for earning their livings. Though in itself it offers only the practical part of the boys training, yet by a common-sense arrangement with the town's public schools it enables boys to secure a very fair hand-skill and technical knowledge, while they are still equipping themselves with the general education which these regular schools provide.

Brantford is a manufacturing city. Here are built the saw-mill plants that are rapidly converting into wealth the great forests of Canada. Harvesting machinery for Ontario, The Great West and far away Australia is largely made here. Yet, Brantford is but a small place, barely twenty thousand inhabitants. Of these, however, over four thousand work in the factories.

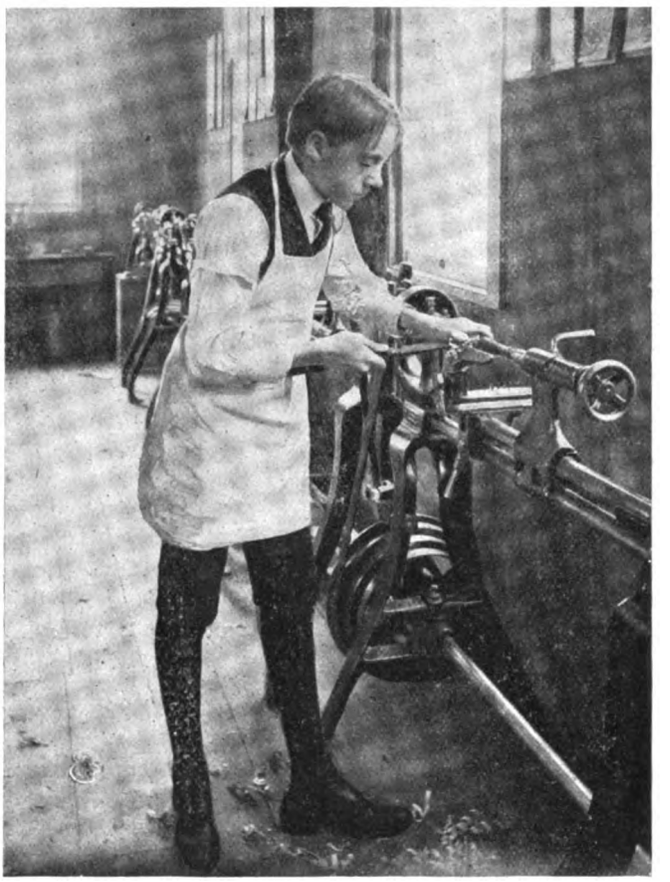
A recognition on the part of the local school authorities that such a community required education of a modern and special sort, lead to the comparatively recent establishment of The Manual Training School. Manual training, as an element in education, has always been in high favor to the working men of the town and with the manufacturers. The former favored it as being a possible direct advantage to their children, by opening the way to desirable vocations, while the latter saw in it the possibility of obtaining for future workmen lads of quickened intellect and special training.

The pupils are also pupils of the high school, or of advanced grades in the public schools. As a part of his general education, the every-day boy in Brantford has the advantage offered him of at least one manual training lesson a week for four years. He receives a course of training in bench-work, with the drawing connected therewith. After pupils master elementary tool operations, as exemplified in certain fixed exercises, they construct objects of their own selection, following always a line of progress and possible accomplishment. Instead of the relatively useless and uninteresting models of the old-fashioned courses, pupils produce pieces of definite value and with individual elements of design—small pieces of furniture, such as tabourets, plant-stands, magazine cabinets and writing desks, designed to fill special home needs. Enough of these are illustrated to convey an idea of the scope of the work in this general course. In a two years' course they learn enough mechanical drawing to make tracings, properly dimensioned drawings of machine parts; they become familiar enough with the wood-lathe to turn simple patterns, master fundamental operations on the metal lathe, and obtain an introduction to the art and practice of blacksmithing.

That, for the purposes of such a school, forging was a particularly desirable course, was felt from the beginning; but as the school's equipment had to be obtained bit by bit, this part of the work has not been established so long as some of the others. However, it has already shown its usefulness and become popular with the boys who work at it. The plan of instruction is similar to that fo



BLACKSMITHING IS A PARTICULARLY DESIRABLE COURSE IN ALL MANUAL TRAINING INSTITUTIONS



THE LATHE IS ALSO AN ESSENTIAL TO THE EQUIPMENT OF THE TRADE SCHOOL

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the American technical schools. Exercises are given which teach elementary principles, drawing, bending, upsetting, welding, and so on; while enough steel work is required to teach a boy to forge and properly harden simple tools.

It will scarcely be questioned that a boy who takes advantage of all the opportunities the school offers, without neglecting his other educational preparation, will be especially fitted for a period of usefulness, and comparatively sure of a reasonable reward in a place of so many industrial advantages.

A Shop-Made Axle Gauge.

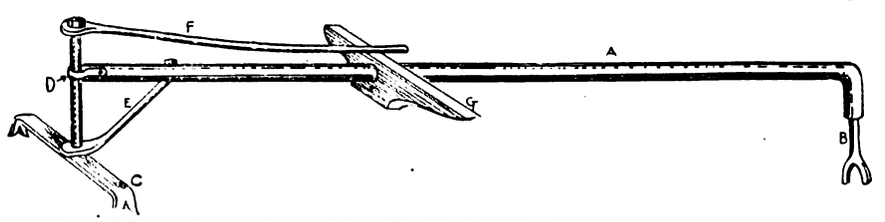
H. E. POBST.

I just recently finished a shop-made axle gauge that is entirely satisfactory. It is made as follows: A is a piece of ¾-inch pipe (most any other light pipe would do as well) with one end filled with sand, and then heated and bent to a right angle. B is a piece of ⅜-inch iron about 7 inches long, with a flat piece welded on and cut to fit over the axle. This piece is driven up in the bend until is is tight. The end C is made as shown, with a square hole in the center. A ⅜-inch rod, with ends made square, is riveted on as shown. D is a ⅜-inch pipe 6 inches long, used to hold the stem of C. A brace, E, of ⅜-inch rod, flattened at one end, and a ⅜-inch hole on the other end, is put through the hole in main pipe and riveted. The flat piece, F, of ¼ by ¾-inch stock, with square hole, is riveted on to stem of C. A wooden slide gauge is shown at G. I made this in about three hours and could make another in about one-half the time.

Wrought Iron Andirons.

T. GOOGERTY.
Instructor in Forging at Illinois State Reformatory.

In "ye olden times" inside heating was accomplished by building a large grate in the center of a room and allowing the smoke to go out through louvers in the roof. Toward the end of the fifteenth century the grate was removed to the side wall, and a large chimney was built to carry off the smoke. This was the beginning of the fire-place.



A SIMPLE SHOP-MADE AXLE GAUGE EASILY MADE AND CHEAPLY CONSTRUCTED

At the present time, while they are still used as a means of furnishing heat, they are principally used as a means of decoration, and in every modern house may be seen a mantel with its andirons. With the large brick fire-place of to-day there its no metal more suited for the purpose of andirons than wrought iron. This article will explain the construction of a set of andirons.

In working out the set shown in the accompanying engraving I have given the length for cutting all the stock, and a careful study of the engravings will enable one to work them out with little difficulty. Of course the size of the opening in the fire-place will have to be taken into consideration. The shaft of the irons should stand past and in front of the opening about four inches, and the back of the log-rail should stand about an inch from back of the opening.

Decorative work should be well forged with the hammer and anvil tools. Avoid using files or emery wheels in this kind of work. Care should be used in the formation of graceful curves and proportions. When the work is finished, let it be seen as forged work—let it be truthful, for what is true is beautiful. There must be no sham; let hammer marks show—they add beauty to the work.

In figure 1, at A, is shown the front and side elevation of the andirons, with dimensions, excepting the volutes. The first thing to do will be to cut the twelve pieces for the top part—enough for both irons. These pieces are upset considerable on one end. All must be the same size. The other end of the piece is then drawn out on a taper; draw it about as much as you upset it and round the ends. As the leaf form on these 12 pieces is symmetrical, you will have to get the pieces out in pairs. They are veined on one side—the top side—suggestive of leaf form, as shown. To do the veining, the tool shown at Fig. 1, D, is used. This tool is made from a piece of ¾-inch square tool steel. It need be but a common tool, with a hole punched for a wooden handle. The bottom part should be ground, as shown, and about ⅛-inch thick, smoothed nicely, so as to make a clean impression.

To vein the leaf form, heat one of the pieces on the tapered end and, bringing it to the anvil, start with the veining tool about ½ inch from point of leaf, letting the helper strike with a hand hammer. Keep the tool moving towards the other end, stopping within 1½ inch of it, and leaving quite a deep impression in the piece. The veins at side are done in the same manner, starting at the outer point and moving the tool towards the center vein, letting it become tangent with it. The impression at the points of the vein should not be as deep as the rest. Continue thus until all the pieces are veined, and they are ready to be welded in a cluster. In welding them, the fire should

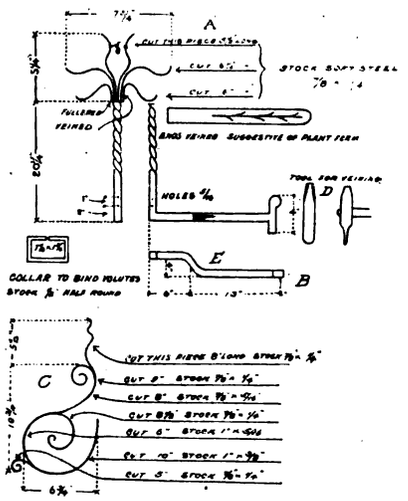


FIG. 1—DIMENSIONS AND DETAILS OF ANDIRON PARTS

be thoroughly cleaned, and built with a good bank of coal on each side, being careful not to have the fire too new. You should also have plenty of well-burned coke. After welding in a cluster they are ready to weld onto the shaft.

The shaft is cut 30 inches long and upset quite large for the top weld. When you have them both upset and scarfed, heat one of the shafts along with one of the top pieces and weld. After it is welded, fuller it on the sides as shown in the engraving, with a large top and bottom fuller, drawing the rest to ⅞-inch square. Proceed with the other one in like manner. The welded pieces at top are now veined as shown, with a dull cold-chisel, down to the fullered part.

The shaft, holding the leaf form at top is twisted for 8½ inches, starting under the fullered part at top, and continuing downward. This twisting is done by heating evenly as much at one time as possible. Then screw the top part in the vice, and with a monkey wrench, on the other end, twist to the right. If any part twists faster than another, drop a little water on part

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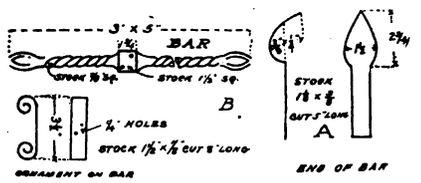


FIG. 2—DETAILS OF CROSS BAR AND THE SCROLL

twisting too fast. Have the twist uniform when done. The top part may now be formed. It would be well to make a drawing of top, on surface plate, using dimensions given and making drawing full size. You now heat the top red and bend the leaf form over the horn to shape it. The bottom leaves should be formed first, then the next, and lastly the top ones. When you have one formed, you may bend the other accordingly.

The log rail B, at Fig. 1, is forged from $\frac{7}{8}$-inch square iron. The weld at back is made first. After welding to the shaft, heat the log rail about five inches back from the front and throw it to one side as shown at E. Now drill all the holes as shown in the engraving.

The volute scrolls are shown at C, Fig. 1, with dimensions, size of stock, and the length to cut each piece. All stock needed for scrolls is now cut. The pieces lettered A, B and F, are veined in the same manner as explained for the top. The piece D, instead of being drawn out, has an eye turned for a $\frac{5}{16}$-inch rivet at end. After they have been gotten out, you may weld the pieces together to form the scrolls. Weld pieces A and B first. Then weld C on and continue as in alphabetical order, drawing the inch-pieces on the edge to $\frac{7}{8}$-inch. When you have the four scrolls welded they are ready to be formed. To do this you should have a full-sized drawing on the surface plate. Now heat the top part red and bend it into shape, and continue until you come to the end. At the end of G, drill holes by which to fasten the scrolls in place on the shaft. When riveting the scrolls in place use a set, so as to make a good looking finish. The collar to bind the top of the scroll work to the shaft is bent from $\frac{1}{2}$-inch half round. This piece is bent as shown at C, Fig. 3. The scrolls and shafts are now set into it and the ends hammered over, binding the whole thing tight. The forming tool may be made of iron or soft steel; anything on the order shown will be sufficient.

The piece on the front of the irons, to hold the bar, is shown at A, Fig. 3. The dimensions are fully given, and it may be constructed without much explanation. The scrolls at the bottom, however, are in two pieces, and upset slightly on one end, welding them together by laying the edge of one onto the other. Scarf them with the same heat and weld to the top part. They are now shaped over the horn of the anvil, the top being bent as shown. After forming, drill the holes for rivets and fasten in place.

The rosette at D, Fig. 3, should be cut from paper and laid on the stock, scribing around it with a slate pencil. Drill $\frac{5}{16}$-inch holes in the loops. This will aid in cutting it out. Now cut around on slate pencil mark with a narrow cold-chisel, or you may use a curved one and then smooth the edges

In modeling the rosette, and all other work on this order, you should use a

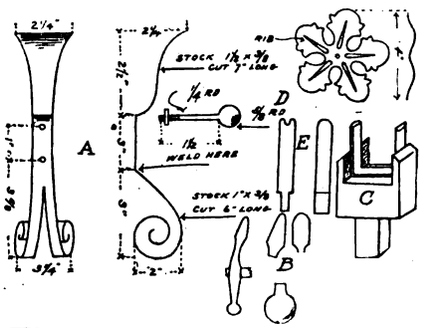
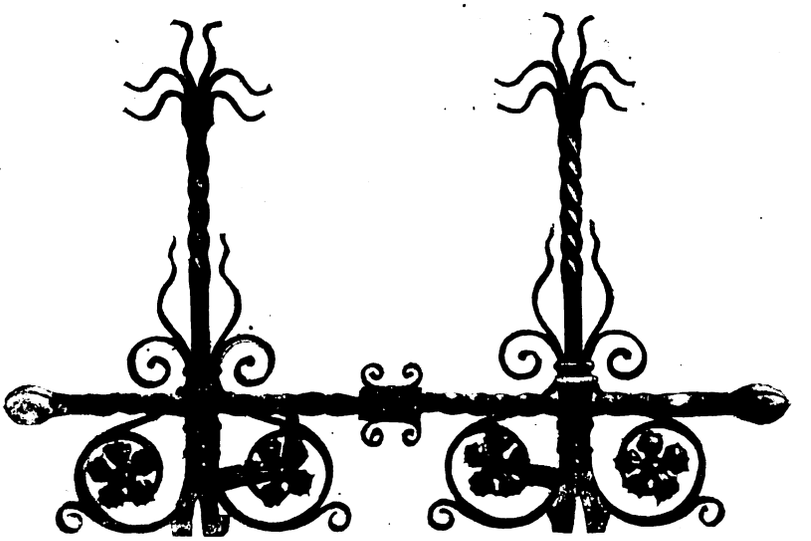


FIG. 3—DETAILS OF AND TOOLS FOR THE ROSETTES AND BAR SUPPORT

block of elmwood, say 3 feet by 10 inches, to model on. Heat the rosette red, and, with a modeling hammer like the one shown at B, Fig. 3, hammer the part to be raised on the end grain of the block. As you hammer the rosette while hot, the wood burns out from under it, and each blow of the hammer forces the metal down, thereby raising that part in relief. The center rib is now put in, using the tool shown at E, Fig. 3. This tool is forged from $\frac{3}{4}$-inch tool steel, and is about five inches long. The bottom part is drawn out as shown, to be screwed in the vice. The top part has a small sink about $\frac{5}{16}$-inch wide, and not quite so deep. It is without any sharp corners and is smoothed nicely. To raise the center rib of the rosette, screw the tool in the vice and set the rosette on the tool, with the sink under part to be raised. Now hammer the metal into this sink, using the pene of the modeling hammer. When all are raised, true the rosette as shown, and drill a $\frac{1}{4}$-inch hole in the center. The center of the rosette is forged from $\frac{5}{8}$-inch soft steel. Draw a shank $\frac{1}{4}$-inch round, cutting long enough so the head may be rounded as shown on drawing. When forged, cut a thread for $\frac{1}{4}$-inch nut and fasten the rosettes in place.

The center part of the cross-bar is forged from $1\frac{1}{2}$-inch square iron; fuller it all around, $1\frac{1}{2}$ inches apart, drawing the shanks out to 1-inch square, leaving a heavy part in the center. The ends or tips are forged from flat stock, four pieces from each end. After cutting the pieces, draw the end of each piece to a point, and flatten something like a spear point, see A, Fig. 2. This will give an idea of the shape. After drawing the spear point out, draw the balance on edge to $\frac{7}{8}$-inch wide. Now heat the spear point and bend it, as shown, by hammering it on the wooden block with a good sized ball hammer. Hammer it on the inside, forcing the metal out and giving it a rounded shape. When all are hammered, weld four of them together, as shown in the engraving, and drawing the end to about 1-inch square, scarfing them on the end at the same time. They are now ready to be welded to bar. In welding the bar to length, use the lap weld, taking separate heats, smoothing the welds

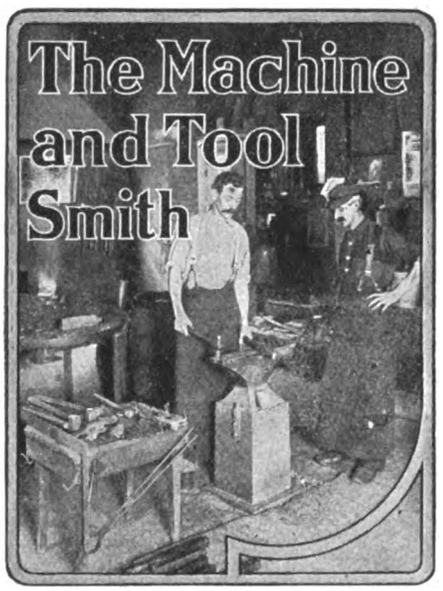


THE IRONS AS THEY SHOULD APPEAR WHEN FINISHED

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to ⅞-inch square. After the bar is welded, heat the ⅞-inch square part to an even heat, and twist it as shown. In twisting square stock care must be taken to have the twist uniform; therefore it is essential to have the heat uniform. When bar is twisted, straighten it on the wooden block with a mallet.

The scroll in the center of the bar may now be turned. Do this by heating the ends of the pieces and bending them over the horn of the anvil, see B, Fig. 2. You will need four, one on each side, and when bent in shape, rivet them in place with ¼-inch rivets, using a set to finish nicely. This will complete the irons. To finish, first see that the irons stand straight, then remove all scales and rough places. Paint them with ivory drop black, ground in japan, or heat irons to a black heat and rub with equal parts of lard and tallow until cool, polishing them with cloths.



When a certain brand of steel has given you perfect satisfaction for a certain class of work, 'tis folly to exchange it for some other brand because somebody has had better results with the latter. We require different grades and makes of steel for different grades and classes of work. And I am likewise inclined to think that various tool smiths need various steels to obtain good results. T. M. S.

Buy your steel of reliable and known concerns only. Swindles of many kinds have been perpetrated on the unsuspecting smith, and one should not be led into purchasing a marvelous metal at an absurdly low price. This is usually the bait served by the unreliable salesman and the unreliable house. Better to pay what the steel is worth and get something that will suit your purpose, than to pay half the price and get something not worth the time it takes to work it. VANDEN.

A Welding Powder for iron and steel may be made as follows: Take 40 parts of iron filings, 20 parts of borax, balsam of copaiba or some other resinous oil 2 parts, and sal-ammoniac 3 parts. These ingredients are now mixed, heated and then pulverized. In welding use the usual process. The surfaces to be welded are powdered with the composition and then brought to a cherry-red heat. when the powder will melt and the parts can be taken from the fire and joined. If the pieces are too large to be placed in the fire at the same time, one can be heated with the welding powder to a cherry-red and then others afterward heated to a white heat, after which the welding may be effected. J. F. W.

Hardening and Tempering Steel.—14.

Mild Steel and Machinery Steel.



E. R. MARKHAM.*

All commercial steel was formerly made by taking bars of wrought iron, placing them in a retort surrounded with charcoal, and subjecting them to a yellow heat until the carbon had penetrated to the center of the bar. The operation was identical with the operation of converting the surface of a piece of iron into steel by the process of case-hardening; only, it continued until the carbon had penetrated to every part of the bar of iron. Steel made by this process is called blister steel, on account of the blistered appearance of the surface. If bars of blister steel are broken to suitable length, piled on each other as shown in Fig. 1, subjected to a welding heat, and then hammered and welded into a bar, the product is called shear steel. If shear steel is drawn out into bars, broken, piled and welded, it is called double shear steel.

Benjamin Huntsman, an English clock maker, had trouble with springs made from shear steel and used in his clocks. The reason will be apparent to anyone who examines the finished surface of a piece of wrought iron, as seams will be observed running lengthwise with the bar. These seams are slag which occur in the wrought iron bar, and which are always present. It is not possible to get rid of all slag in the operation of puddling, rolling and hammering incident to the manufacture of wrought iron; and, as blister steel is made from wrought iron, the slag seams remain after it is converted.

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In order to get rid of the slag, it occurred to Huntsman that the steel might be broken into small pieces, melted in a crucible, and the slag,

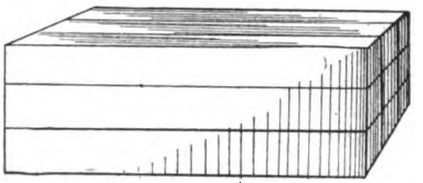


FIG. 1—THE BARS ARE PILED AND WELDED

which was much lighter than the iron, would rise to the top and could be skimmed away.

This was tried, and when the molten steel was poured into a mold, it formed an ingot free from slag. This steel, when hammered out into bars, gave what was called crucible cast steel.

The two forms of low grade steel on the market, *i. e.*, Bessemer steel, and open-hearth steel, are in reality cast steel, as the molten metal is cast into ingots in molds. But the manufacturer who applies the term "cast steel" to the product of either the Bessemer converts, or the open-hearth furnace, does it—generally speaking—to deceive the buyer into thinking he is getting crucible tool-steel.

Bessemer steel is made by blowing air through a mass of melted pig iron. Pig iron is a product of the blast furnace, and is obtained by first building a wood fire in the furnace. On this is piled successive layers of coke, flux and iron ore, and a blast of air is forced into the furnace through the tuyeres. The air blast is heated by means of stoves, which in turn are heated by the waste gases that pass off from the furnace. The air blast being heated effects a saving of 50 per cent in fuel over the older method of using a cold

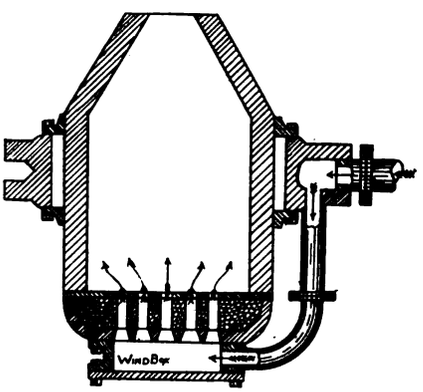


FIG. 2—SECTIONAL VIEW OF A BESSEMER CONVERTER

air blast. The melted iron, being heavier than the earthy or slag matter, sinks to the bottom, or hearth, and is

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drawn off through the tap hole, while the slag is drawn through the "slag eye."

If the iron, when drawn out through the tap-hole, is run into troughs in the ground, or into metallic molds, the product is called pig iron, and is used in the foundry cupola for producing iron castings, or is melted in the puddling furnace, puddled, rolled and hammered into commercial bars, the product being the wrought iron of commerce. When making Bessemer steel, the "pigs" may be melted in a cupola, and the contents conveyed to the converter that is shown in Fig. 2, or the molten metal may be carried directly from the blast furnace to the converter. Cold air is blown through the tuyeres, entering the wind box through the pipe, which passes through the trunion, as shown.

(To be continued.)

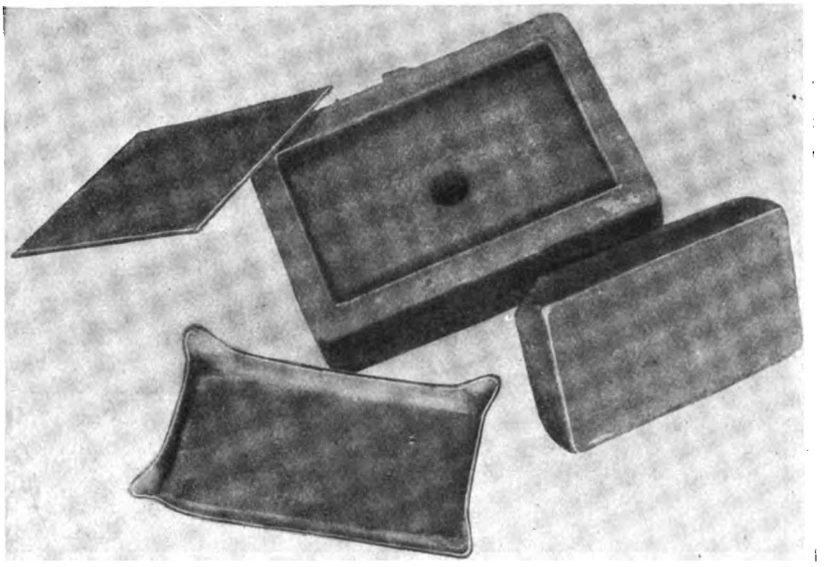


FIG. 2--THE TOOLS USED, A PIECE OF THE FLAT STOCK AND AN UNSHEARED PAN

Stamping Work with the Steam Hammer.



JOHN L. BACON.*

The following is a description of a piece of work which, under ordinarycircumstances, would have been done on a very different type of machine, but which in this case was necessary to do on the steam hammer. A number of pans similar to that shown in Fig. 1 were required. The pans were about 6 by 8 inches and 1 inch deep, and made from stock about $\frac{1}{10}$ inch thick. The first thought was to cut stock of the proper thickness, 8 by 10 inches, trim the corners, bend the sides up into shape, and braze the joints. By cutting out a piece in each corner, as shown by the dotted portion in Fig. 4, this could have been done, but it was finally decided to try stamping them out of the sheets, leaving the corners solid.

The tools used for the work are shown in Fig. 2. What might be called the top die, is shown to the right, and is simply a solid block of cast-iron with the sides slightly tapering, and of just the proper size to fit the inside of the pan to be made. The bottom die is shown in the center. This was also a block of cast-iron and had a depression in the top, the size of the outside of the pan and about $1\frac{1}{4}$ inches deep. This block was about 1 inch larger all around than the outside dimensions of the pan, and about three inches thick.

The stock used was sheared up into plates of the proper size. These plates were heated red hot, and placed, one at a time, on the bottom die, which rested on the anvil of the steam hammer. On top of this plate the top die was placed and driven home with one or more blows of the hammer. It was found that the dies and pan were pretty firmly stuck together after this hammering, and to knock out the pan and top die a hole was drilled in the center of the lower die, about 1 inch in diameter. The dies were turned on their side, a punch inserted in the hole, and the pan and block driven out with a few blows of the sledge. This left the pan sticking to the top die, which was turned flat on its bottom, and the projecting "dog ears" on the pan given a few

* John Lord Bacon was born in Chicago, educated in the public schools, at the Chicago Manual Training School, and later at Lewis Institute, at which school he has been instructor in forging for the past eight years. He is the author of "Forge Practice," forging instruction paper of American Correspondence Schools, forging paper in "Modern Shop Practice," and also junior member American Society of Mechanical Engineers.

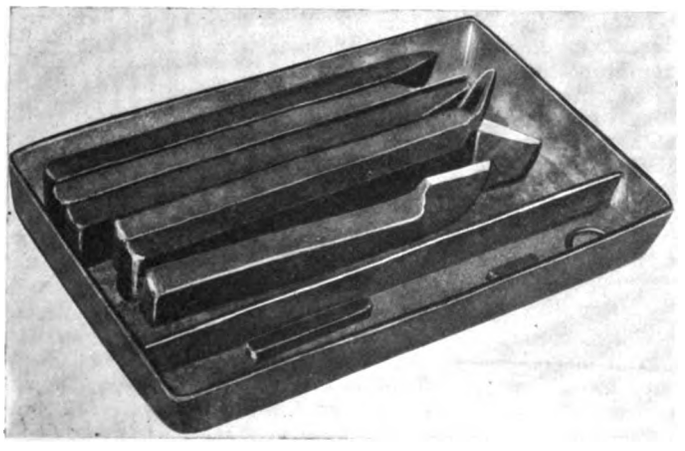


FIG. 1--THE PANS WERE TO BE 1 INCH DEEP BY 6 BY 8 INCHES AND OF 1-10-INCH STOCK

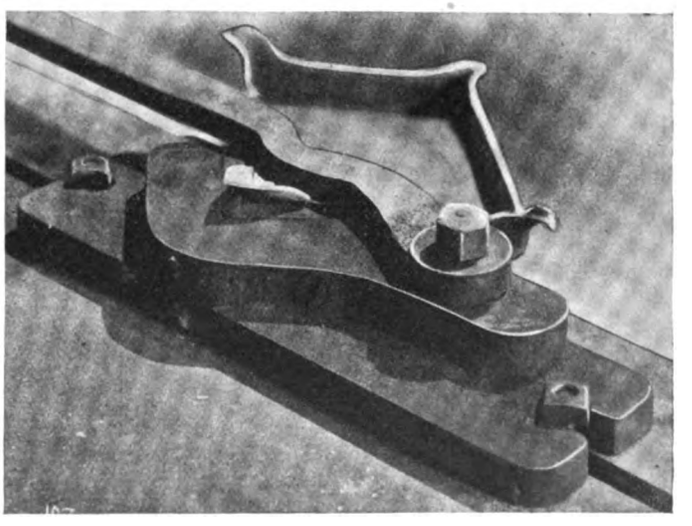


FIG. 6--A SPECIAL SHEAR WAS NECESSARY FOR CUTTING OFF THE "DOG-EARS"

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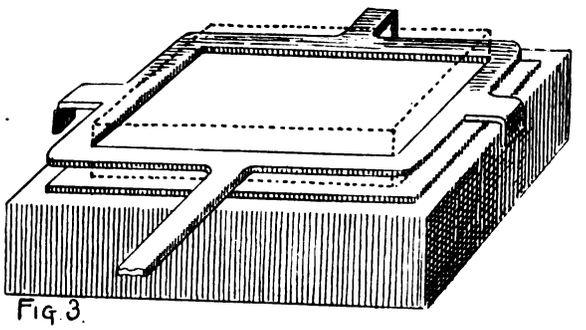
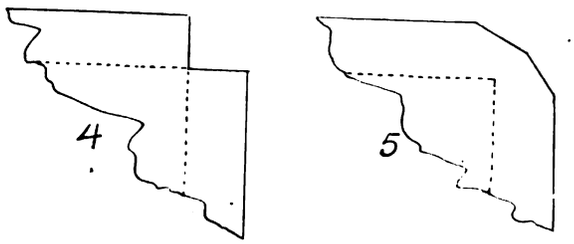


Fig. 3.



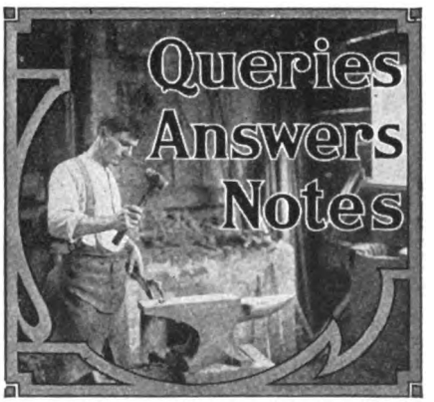
OTHER METHODS OF SHAPING PANS AND CUTTING CORNERS CAN BE USED

sharp blows with the hand hammer, which loosened the pan sufficiently to allow it to be shaken from the block. The blank and top die were centered by the eye alone, excepting that the bottom die had a stop fastened to the back side. It would have been much better to have had these stops all around the bottom block. The top die could have been located by means of a spider, such as shown in Fig. 3. After the stock and top die had been placed, this spider could have been slipped over the top die, with the fingers projecting down over the bottom block. One blow of the hammer would have driven the top block down far enough to have held it in place, when the spider could have been removed and the forming finished.

At the left, in Fig. 2, is shown a piece of the stock before being shaped, and in the lower part of the engraving is one of the pans after being formed. It will be noticed that the corners are drawn up in a peculiar "dog eared" shape. If the stock were cut as shown in Fig. 4, that is, if a part were cut out of each corner, there would be just enough metal to form the pan. Now, when the stock is left solid, this part must go somewhere when the pan is stamped into shape, and the result is the "dog-ear"on each corner.

After the forming is done it is necessary to trim off this extra metal at the corners. The experiment was tried at first of trimming off just enough metal, while the sheet was still flat, to prevent this "dog-ear" from forming, but it was found that some trimming was still necessary, and, as it was very little more trouble to trim off the entire amount at once, the sheets were left untrimmed. It was found that if the sheets were trimmed as shown in Fig. 5, very little metal was drawn up above the edge of the pan, but there was still enough to make trimming necessary. To trim the corners a special shear was made, shown in Fig. 6. The base of this shear was made of cast iron, and the cutting edge of a piece of ½ by 1-inch tool steel, bent into shape and fastened to the cast iron back by means of two screws, as shown. The top piece of the shear was made by bending into shape the end of a ⅝ by 1½-inch tool steel bar. The pans were heated one by one, and the corners sheared off while hot. A small amount of grinding was necessary to smooth off the edges after the trimming was done.

The partition shown in the pan was brazed in, and was made from a piece of ⅛ by 1-inch stock. The brazing was done in an ordinary forge fire.



The following columns are intended for the convenience of all readers for discussions upon blacksmithing, horseshoeing, carriage building and allied topics. Questions, answers and comments are solicited and are always acceptable. Names omitted and addresses supplied upon request.

Wants to Make Lathe Tools and Brass Molds.—I would like more information on the making of lathe tools of all kinds; also, molding in brass and the making of molds in sand. GEORGE REDMOND.

To Make Key Ways.—Will some one tell me the different methods of making key ways in shafting, that can help the country blacksmith to do the job? Can some brother smith having experience along this line favor me with some good practical information? H. L. L.

A Question on Hoof Diseases.—I would like very much to hear from horseshoers, through THE AMERICAN BLACKSMITH, about a case of "hoofbound" that a customer of mine told me he cured as follows: He cut creases from the coronet down the length of the hoof. These creases were about one-half of an inch apart, all around the hoof, and were cut clean through the wall. A hoof ointment was used, and the horse was worked light after a few days. He further stated that he treated several that way and all were well cured. A. N. SCHMITZ.

Tempering Mill Picks.—Replying to Z. J. Monette, would say to temper mill picks use the following:

1 oz. corrosive sublimate.
1 " sal-ammoniac.
1 " pre. potash.
1 " saltpetre.
1 quart salt.
4 gallons water (soft water).

Heat steel to cherry red and cool in the bath. A. P. WOOD.

Has Trouble in Dressing Cold Chisels.—I have a great deal of machine-shop blacksmithing, and find a great many good points which are of benefit to me. I have a good many cold chisels to dress and do not have very good luck with them. Will you kindly help me in this trouble? I use Sanderson's steel. I sharpen a number of stone-cutters tools, but have no trouble with them. To dress a cold chisel I forge on a bright heat until the chisel commences to get black. I then anneal and file it. I then heat to a cherry red and chill it in plain water, letting the chisel run until the red is off. I then set it in oil and let it cool, letting the temper come slow. Still, they seem to break. A SUBSCRIBER.

A Few Prices from Texas.—Prices generally are too small in this section and material is getting too high. We have a rich country and should have a fair price for our work. The farmers can't do anything without smiths and wood makers and shoers. Here are some of my prices, and they are strictly cash:

Wagon tongues and buggy poles	$3.00
Bent wagon hounds	3.50
Horseshoeing, plain, four new	1.00
Resetting shoes	.80
Setting wagon tires	2.00
Setting buggy tires	3.00
Common plow handle, round, per pr.	1.25
Plow shares, sharpened	.10 to .35
Building wheels, per set	40.00
Refilling wooden wheels, per set	22.00
Buggies and beds	$9 to 20.00

This is the way most of my prices run, and I think they are about what they should be. W. F. MCDONALD.

A Letter from Mississippi.—I went into business here eight years ago, with one dollar. I had a large family and no help. I had only a few tools, but would not go in debt, so I drudged along and purchased as I was able. I now have all the tools I wish for blacksmithing and wheelwright work. I have a gasoline engine and a band saw, a drill and lots of small tools for the blacksmith and wheelwright departments and for horseshoeing. I also have a Barcus horse rack. I have also

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a nice little cottage, built on the corner worth $2,500. I also own my own shop, which is 70 feet long by 30 feet wide. I do not owe over $25.00, have a bank account and a little over four hundred dollars to my credit. I work three men beside myself now. J. W. LAMBERT.

A Maryland General Shop.—As we have not written to you yet, will tell you of our business; it may be of some help to some brother. Our shop is in the shape of an H; blacksmith shop in one end, wheelwright in other end, and back of all our machinery. We have a 20-inch planer, a rip saw, a turning lathe, a hack saw, a drill, an emery wheel, a boring machine, a band-saw, and a spoke tenon machine, all driven with a six-horse power Lambert gasoline engine. I think they are as good as there is made. It never gives us any trouble and is always ready. We are located in a town of 600 inhabitants, surrounded by a good farming country. Three of us work the year round. We build lots of new work, such as dog carts and lumber wagons. We ship our horse carts to all parts of the two states, and get fair prices for all our work. We get from $6.00 to $10.00, for painting a carriage. The accompanying engraving is an exterior view of ourshop. SEABREASE.

A Smithy and Paint Shop of Massachusetts.—The accompaning engraving is a picture of my shop, which is 16 by 32 feet. I have two fires, one drill press, one Green River tire up-setter, one Reynolds tire bolting machine, one large bench vise, one shoeing vise, one tire bender, bolt clippers, screw plates, and various other small tools. A few of my prices are as follows:

Four new shoes from	$1.25 to $1.50
Bar shoes	1.00
Leathers	.25
Resetting four old shoes	.60
Sharpening four old shoes	.80
New buggy shafts, old iron work	3.50
New tires ⅞ in. $5.00, 1¼ in	5.50
Resetting old tires ⅞ up to 2-in. per set	2.00
Resetting old tires, 3-inch $3.00	
4-inch	6.00
Single spokes	.25

My paint shop is 16 by 40 and prices are: Painting buggy, $7.00 to $10.00; painting express wagon, $10.00 to 14.00; varnishing old jobs—buggy, $5.00; buggy with top, $6.00; express wagon, $6.00. Other prices proportionate. GEO. A. BRALEY.

Two Questions by a Michigan Smith.—I do not see how I could get along without "Our Journal." The notes on horseshoeing are well worth the price of the paper. I run a general horseshoeing and repair shop, and have just built a 24 foot addition to my shop. I have a five-horse power gasoline engine and run a planer, a small circle-saw for ripping plank and such things, a band saw, a wood turning lathe, an emery stand, a grindstone, and a drill. I run all with the engine, and have lots of work. I do a lot of horseshoeing and would like to ask a couple of questions: I have a pacer that crossfires badly. I have tried several different ways to stop her—light all around, and leave the outside of hind shoe long and turn it out quite sharp; but I cannot stop her from pulling the front shoe, if they speed her. Now, I would like some brother to give me some advice. I am young and can learn yet. Which will run the easiest, a wagon with a small spindle or one with a larger one, both to be of the same heft and carry the same load? T. J. GILBERT.

On the Tempering of Drills.—In reply to Brother George Petroff: Tempering machine drills depends on the hardness or toughness of the rock to be drilled. For limestones and other work that cuts slow and fine, the temper should be drawn to a purple, or pigeon blue, or even softer in some cases. For quartz, and most of the silicious rocks, the steel should be almost as hard as fire and water can make it, or a careful, short, cherry red heat, plunged and thoroughly cooled. The color of your temper should then be white, but, if possible, not more than half an inch back from the cutting edge.

No matter what kind of rock is to be drilled, or what kind of a temper you want, there are three items that must be observed,—you must take an even heat, as short a heat as possible, and as low a heat as will give sufficient hardness. Too hot and too long heats are two unpardonable vices of the toolsmith. When you get so well along that about 90 to 94 per cent. of your drills stand, in bad ground, you are doing good work. Tool sharpening, at western mines, is my business. I do nearly all my tempering right from the anvil, which makes quicker work, but space will not permit me to explain the method in this article. I will gladly give you any information my experience affords. JOHN A. LAWSON.

A Georgia Shop Electrically Equipped.—We have a good business here and work six men and two boys steadily, beside my partner and myself. We have a seventeen horse-power electric motor, which runs the rip-saw, planer, drill-press, grindstone, emery-stand, band-saw and the fan for the forges. We have been in business a little over two years, and have worked up the largest trade of any shop here. Prices are not very high, but this is due to the many small negro shops that work for just about enough to live on. They don't bother us much, however, because we are fitted up to do work fast and guarantee every job. And, as everybody knows, it's the shop that can turn out fast work, that gets the business. Most of our customers seldom ask a price. They send the work and we chargo what is right. My advice to my brother smith is to put power into your shop and be as near up-to-date as possible. We could not do our work without power, unless we had about four more men. We also have a Barcus horse stock, a spoke tenon and boring machine, and a tire upsetter and bender. My motto is, "What's worth doing at all is worth doing well," and if I take a job too cheap by mistake, I just go ahead and do it just as I said I would. I have never yet seen a perfect man. We all make mistakes sometime and, as the editor says, "A man may learn even from the small apprentice boy." This has been proven to me E. C. HORTON.



A GOOD LOOKING SHOP WHERE PAINTING AS WELL AS SMITHING IS DONE



A MISSISSIPPI SHOP DOING GENERAL SMITHING AND VEHICLE WORK

A Few Words from a Tennessee Smith.—I have been in the woodwork and blacksmith business nearly 13 years. Eleven years of this time I did all my work by hand, but now I see my mistake. If you haven't machinery already in your shop, go at it now, so you can do first-class work. And don't think that any kind will do. I am a country workman, raised on the farm. I do all the work for my farmer customers as near like what I would want as I can. I have two gasoline engines of two horse power each. They are Fairbanks-Morse make. One I use for all light work, and when I need more power

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I use both. I have a jointer, band saw, boring machine, drill, rip saw, cut-off saw, blower, and use a large grinding stone. I also do my wife's washing and run a pea-huller with these engines. My motto is to try to do every job better. My shop is 30 by 40 feet with a shed on the side.

I see a good deal about filling Sarven wheels. Remember, I am no expert by any means, but I have filled many a one; some of them have been running about four years. I can fill these cheaper than I can furnish new ones. I spoke them for $2.00. I remove all rivets the first thing, then fill the wheel perfectly, using plenty of good glue, bore and rivet with good soft rivets. I then take a large old steel harrow tooth and bore a hole in the small end, to make a nice head on the back of these rivets. This method makes a wheel look like new. I mention this as it may be of some help to some young smith. I have seen smiths just hammer the rivets down till they are almost as large on the end, as a 10-cent piece. But this looks very bad and untidy J. T. WATRIDGE.

How a Smith Started in Tennessee.—I have just been reading the wagon-maker's letter in the November issue, and find his article a very good one. I also make wagons and do a general repair business. I am a young man; been in the business about eight years. I have been doing business for myself two years. I began work very young and had a poor chance. My father was a farmer and kept me in the field or in the woods making rails. But I kept at my father for a shop, and at last he found an old bellows, an anvil that had all the edges broken off, two old hammers with the faces battered up, and two pairs of old tongs, that a man wouldn't have at all. So my father and I hauled the shop tools home to an old house on my father's place, and made a forge frame out of a few boards. I was now ready for business. All the next day, and during spare time, I would be at the shop sharpening all the old, worn-out plows that I could find. When spring came, I had worked and fixed up my shop and my father would risk me to hammer his plow. I kept at the work, and finally shod one of the horses. People then began noticing me, and began bringing in plow work and horses. I worked up a very nice trade, so began looking for something better. I then hired to an old blacksmith for $17.50 per month and worked six months. Finally, after more or less moving about, I married.

Then I knew I was stationed, so I bought two acres of land from the man that I was working for, built a small house and worked on with my partner about a year. When I got my deed and all secure, I pulled out from the old man and built a shop of my own. Here I began general smithing, horseshoeing, wagon making and repair work of all kinds. I have now been located here about two years, have a shop, and am now building a new house, and have a good trade. When I get a customer I keep him, so I have just about put the old man out of business. He doesn't like work in any form, and doesn't try to keep his trade. We have four shops here and two of us are doing the work. P. M. WADE.

An Illinois Shop and Some Prices.—The accompaning engravings show two views of my shops, which are built together. The wagon shop is 18 by 36 feet, and the blacksmith shop is 20 by 36, with a double door from one to the other. You will notice in the background, my little two and one-half horse power Weber, Jr., which is surely a labor-saving machine. I have it belted to a 26-foot drive shaft, with five machines attached to this shaft, and a counter-shaft from this, that is 12 feet long. I have an 18-inch rip saw on this shaft, and have a 32-inch band saw coming, which I intend to put on the same shaft. On the main drive shaft I have my emery stand, disc machine, drill, lawn mower grinder, and 32 by 4-inch grind stone. I can run any two of these machines at one time, except the saw, which is a load by itself. I do a very good business and am well pleased with my investment.

Some of our prices are as follows:

New shoes, per set	$2.00
Resetting, per set	1.00
Setting buggy tires	2.50
Setting wagon tires	2.00
Pointing cultivator shovels	2.00
Sharpening cultivator shovels	.40
Pointing and sharpening share	1.00
Setting buggy axle	1.00
One new axle	3.25
Wagon tongue	2.50
Bolsters	1.50

All other things are in proportion.

I do a good deal of advertising in the home paper, and get out special bills before the spring season opens up, I also use my typewriter to good advantage between times. RUFUS T. MONK.

A Letter and Some Questions.—I am doing the blacksmithing for a saw mill company, and their work covers a large field. They have all of their hooks, sliding tongs, chain hooks and all other things used in logging made in this shop. They have 110 horses and mules to keep shod and, as this is the Ozark mountains, and the roads are rocky, the shoeing is quite an item. I have all the smithing to do, and they keep a wood worker in the shop. Our wagon work runs from a lumber wagon with one and one-half-inch tire to a log wagon with a four-inch tire five-eighths of an inch thick.

Will some of the saw-mill smiths give me their rule for making cant hooks? I have also some trouble with the four-inch tire burning on the edge before they get hot enough to weld in the center. We will have to have a new tire shrinker, which would be the best for our shop? Will the cold shrinker work on the 1½-inch tire and also on the four-inch tire?

The company's mules nearly all had crooked feet, when I went to work for them last June, but I have got them pretty well straightened up. Some of their feet were turned over on the outside and some on the inside. The way I straightened them is to pare the rolled underside down, getting the bottom of hoof as near the same distance from the hair on each side as I could, and then shoe with a shoe wide at the heels, setting it with heels same distance from frog on each side, and the shoe straight with frog. You will have to straighten the shoe on the roller underside if very crooked. Leave the shoe extending out on the rolled underside just so you can get a nail hold. Always set shoe on the foot straight with frog, and rasp the hoof which extends over the shoe on the opposite side from the roller under side. Then if you will step back of your mule, the foot will look straight, and will also look straight from the front. If any of the shoers have a better way to straighten a bull-footed horse or mule, I would be glad to hear it, as I read everything on shoeing that I can get. H. K. DERKS.



INTERIOR OF AN ILLINOIS SHOP--WAGON SECTION



THE MACHINERY IN THIS ILLINOIS SMITHY IS RUN BY A GASOLINE ENGINE

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THE STANDARD TOOL CO'S BLACKSMITHS' TWIST DRILLS



These drills are made with ½ in. and ⅝ in. diam. round shanks, and will fit all makes of Blacksmith's drill presses. The slab or flat portion of the shank allows the drill press set screw to hold the tool firmly, preventing slipping and injury.



STANDARD TOOL CO. STANDARD TOOL CO.

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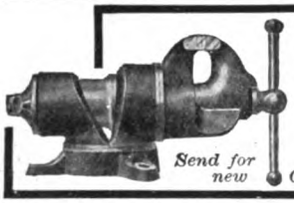
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are made from tough, durable, lively NEW RUBBER. **Quality** is the first consideration. Our **"Wing"** Tire will outwear several ordinary rubber tires. The wings (see cut) keep water, sand and grit from working between the channel and the tire, to wear out the tire from underneath, Write for particulars.

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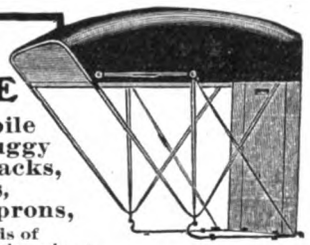


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Prices Current — Blacksmith Supplies.

The following quotations are from dealers stock, Buffalo, N. Y., Jan. 1, 1907, and are subject to change. No changes have taken place since last month's quotations.

All prices, except on the bolts, are per hundred pounds. On bars and flats prices are in bundle lots.

Bars—Common Iron and Soft Steel.

¼ in..	round or square;	Iron,	$2.95;	Steel,	$2.95
⅜ in..	"	"	"	2.55	"	2.40
½ in.,	"	"	"	2.35	"	2.20

Flats—Bar and Band.

¼	x 1 in., Iron	$2.40;	Steel		$2.40
¼	x 1½ in., "	2.30;	"		2.30
3-16	x 1½ in., "	2.50;	"		2.50

Norway and Swedish Iron.

¼ in., round or square	$4.90
⅜ in., " "	4.50
½ in., " "	4.30
¼ x 1 in	4.30
¼ x 1½ in	4.20

Horseshoe Iron.

For No. 1 shoe, ⅝ x ½ in	$2.50
For No. 2 shoe, ½ x ⅝ in	2.50
For No. 3 shoe, ⅝ x ¾ in	2.50
For No. 4 shoe, ⅝ x ⅞ in	2.50

Toe Calk Steel.

½ x ⅝ in. and larger	$3.00

PATENTS FRANKLIN H. HOUGH, Washington, D. C. No attorney's fee until patent is allowed. Write for Inventor's Guide.

PATENTS Write at once for most liberal offer ever made for obtaining patents and ask for Inventors' Guide, the best book published Est. 20 yrs. WM. N. MOORE, Wash. D. C.

PATENTS Herbert Jenner, patent attorney and mechanical expert, 608 F St., Washington, D. C., established 1883; I make an examination free of charge and report if a patent can be had; also the exact cost. Send for circular.

PATENTS PROTECT YOUR IDEAS

Send for Inventor's Primer. Consultation free. Established 1864.

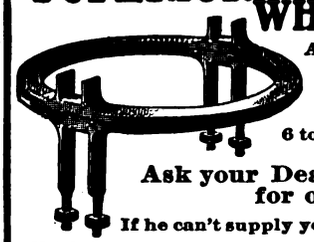
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Send us a Sample Order.

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R. E. McDONELL, Crystal Falls, Mich.

FOR SALE—Stock and tools. Write to
G. F. FARRELL, Vincent, Iowa.

WANTED—Blacksmith finisher. Address
WOEBER CARRIAGE CO., Denver, Col.

FOR SALE—Power blacksmith shop and dwelling. Write at once to
C. F. ANKERMANN, Deep River, Iowa.

WANTED—At once! Good, reliable floor-man. Good wages. Apply to
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FOR SALE—Blacksmith shop. Very cheap. Owner must sell on account of health.
EDWARD OLSON, Robbin, Minn,

PATENTS SOLD ON COMMISSION— To buy or sell a patent write to E. L. PERKINS,
Patent Broker, 66 Broad St., Boston, Mass.

WANTED — Blacksmiths to handle Mineral Heave Remedy. No cure—no pay. Liberal terms to agents. Write for booklet, MINERAL HEAVE REMEDY CO., 418 Fourth Ave., Pittsburgh, Pa.

WANTED—A good general Blacksmith and Horseshoer. Work the year around. $3.50 per day to the right man. Apply to
FOSTER & McLEOD, Macleod, Alberta, Can.

FOR SALE—Stock and tools of carriage and repair shop. Will sell cheap. Good opportunity for one or two good mechanics. Lots of horseshoeing to do. Address C. G. SANDBERG, Helena, Ark.

FOR SALE—Blacksmith and wagon shop, also tools and materials. The reason for selling, I am 67 years old. For terms, write to
THOMAS BALL, Fairland, Indian Territory.

WANTED—Country smiths to know how I originated big paying side line. Inexpensive and great ad for shoeing. Information free. Address
DAVID SMITH, Farrier, Zoneton, Kentucky.

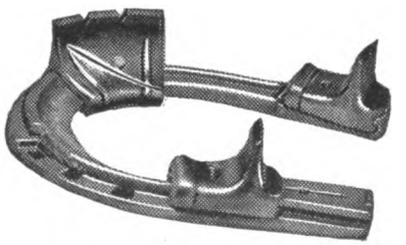
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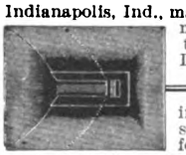
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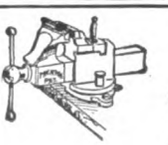
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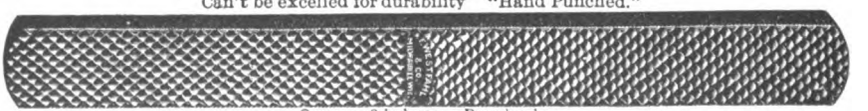
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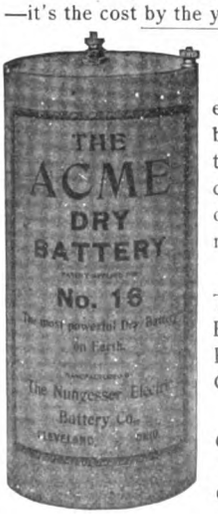
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WILLIAMSPORT

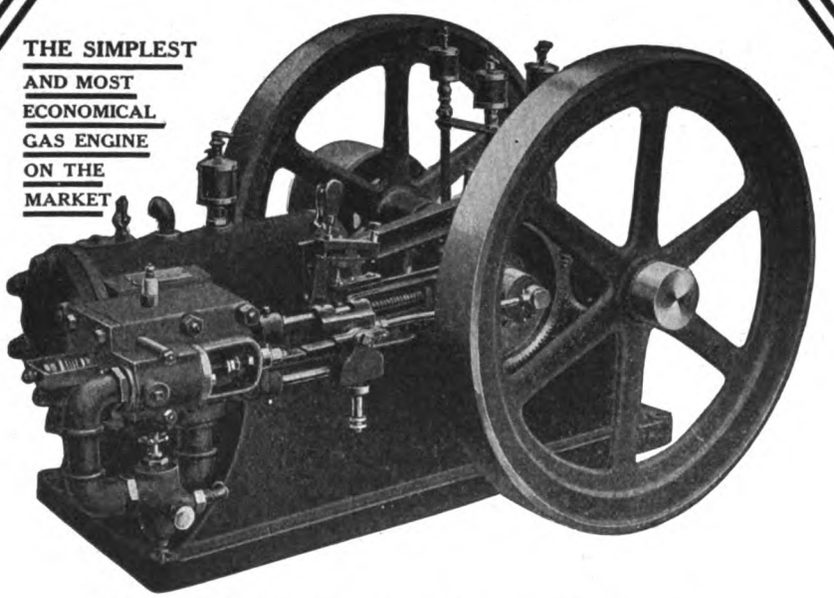
GAS AND GASOLINE ENGINES

2 TO 25 H. P.

ALWAYS READY TO START. NO ENGINEER REQUIRED.

THE SIMPLEST AND MOST ECONOMICAL GAS ENGINE ON THE MARKET

NO INCREASE IN INSURANCE BY THEIR USE.



A Broad Guarantee goes with every Williamsport engine. Every machine is thoroughly tested before leaving our factory, and we will replace any part found defective in material or in workmanship, within one year from date of purchase We are building **an engine of quality** giving satisfaction everywhere on acccount of its simplicity, durability, ease of operation and beauty of design.

Our Giant 4 H. P. Engine is the Best on the Market for Users of Small Power.

Handsome 1907 Calendar Free.—We will gladly mail you one of our fine calendars free. They are very appropriate for the shop. Send your name and address today.

ILLUSTRATED CATALOGUE FREE.

ILLUSTRATED CATALOGUE FREE.

WILLIAMSPORT GAS ENGINE CO.

WILLIAMSPORT, PA.

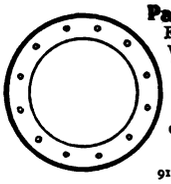
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KICKERS

Can be Cured. So can the Balkers, Shyers, Runaways, etc. I will tell you how. Particulars free. Write today.

PROF. JESSE W. BEERY, Pleasant Hill, O.



Patent Vehicle Hub Bands

For strengthening new and old wheels. Any one can apply this improvement, and make the wheels last for years. Sample set of 8 bands sent prepaid to any part of the United States on receipt of $1.00. Address

C. TOOMEY & CO.
Builders of Light Vehicles
915 Campbell St. KANSAS CITY, MO.
Established 1873.

Trade Literature and Notes.

THE IMPROVED EASY HOOF TRIMMER is a very valuable and helpful tool for the horse shoer. The Muncie Wheel & Jobbing Co. of Muncie, Ind., who are advertising this hoof trimmer on another page of this issue offer same to our readers at the price of $1.75 each and when at such low cost, this handy tool should be added to the equipment of every shop.

IN THIS ISSUE appears the initial announcement of the Tudor Mfg. Company, Worcester, Mass. who are offering to our readers a splendid line of wrenches and clamps. A description of these will be found on page 67.

THE "NEW WAY" MOTOR COMPANY, Lansing, Mich. have issued an interesting little booklet on their air cooled engine. The pamphlet is especially useful to the men considering the installation of power, since it contains over 30 testimonial letters from users of these engines. A copy of the booklet can be obtained by writing to the above named firm.

KERRIHARD'S POWER HAMMERS and the splendid line of emery grinders being made by The Kerrihard Company of Red Oak, Ia. are illustrated and described in the little pamphlet this company has just issued. Readers who are intending to improve their shop equipment with this class of machinery would do well to write for a copy of the folder which also contains prices on the different machines.

ON ANOTHER PAGE OF THIS ISSUE will be found an illustration of the little Giant Axle Box Press. This device is patented and is used for putting in and taking out axle boxes by screw pressure without danger of bruising the box. The device is very popular and is made by The Heartley Machine, Variety & Iron Works, Toledo, Ohio.

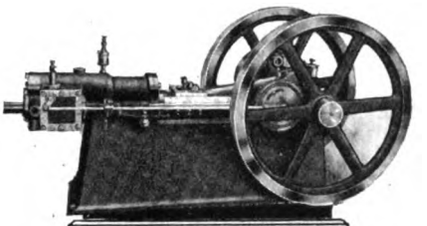
A BEAUTIFUL CALENDAR IN COLORS can be secured by writing at once to Holroyd & Co., Manufacturers of Stocks and Dies, Waterford, N. Y. Send for one for the shop.

THE CAMPBELL IRON CO., St. Louis, Mo., have published a book of 614 pages, a most complete illustated catalogue of tools and supplies, including iron and steel, heavy hardware, wagon and carriage woodwork, trimmings, paints, brushes and varnishes. We are advised that this firm is now doing a heavy mail order business.

THE HENRY MAYERS MACHINERY CO., St. Louis, Mo., who have been selling tire setters to our readers for some time, were recently incorporated for $50,000 under the name of Mayers Tire Setter Mfg. Co.

ATTENTION IS CALLED TO PAGE 62 and the advertisement of The Rowe Patent Calk Co. THE AMERICAN BLACKSMITH has from the very start urged the horseshoers to organize for their own protection and we have been instrumental in bringing the craftsmen together in many sections. The shoers should appreciate this action on the part of the Rowe Calk Co. and the services they offer and we hope our readers who are not already members of associations will take advantage of this opportunity.

THE ROBERTSON
STRAIGHT LINE ENGINE



BLACKSMITHS!
Now is your chance to get a high-class, smooth-running, engine from 3 to 30 H.P. at a
BARGAIN FOR CASH
We will reduce our stock before taking inventory. Get your Order in early.
Robertson Mfg. Co., Buffalo, N.Y.

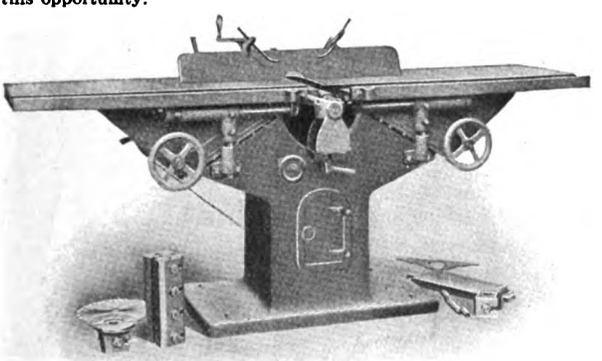
ABOVE 20 YEARS AGO, (1886) rubber pads for horses were first brought to the notice of horse owners in the United States. They of course, like all new inventions were of a crude nature but from the start were more or less beneficial.

As pavements began to be used in our larger cities the use of rubber pads became an absolute necessity and naturally a number of different styles appeared.

The only thing that was taken into consideration at this time was to produce a pad that would prevent slipping and consequently a great many different styles of pads and rubber shoes were made that were impracticable and extremely hard to fit, and while they would prevent slipping to a degree, they proved more harmful than the old-fashioned method of shoeing and eventually disappeared.

The use of Bar Pads and also one or two styles of Cushion Pads have to-day become universal and are acknowledged by all that have used them to be of great value in prolonging the useful age of all horses that come in contact with artificial roads such as asphalt, granite, brick, macadam, etc. In the Surefoot pad are retained good points of both the Bar and Cushion Pad with the additional advantage of preventing slipping. The "Surefoot" pad is so constructed that it forms a Vacuum when in contact with the ground which assures a secure footing and keeps the foot in a healthy condition, preventing malformation and disease at all times. If interested in this line make it a point to investigate the merits of "Surefoot" pad, These pads are made by The Consolidated Hoof Pad Company, New York City.

THE ATTENTION OF ALL WOOD WORKERS is directed to the splendid machine here illustrated, its fine construction, its many uses and wide range of work. The Cordesman-Rechtin Co., of Cincinnati, Ohio, is designing and constructing this new No. 1 Royal Standard Universal Wood Worker aimed to produce a machine that would make the greatest possible variety of finely finished work at the minimum of costs. This machine is suited for ripping, cross-cutting, miter sawing, jointing and planing up to 12 inches wide, gaining, boring and in fact almost all kinds of work can be successfully done on this modern machine, its usefulness probably being limited only by the skill of the operator.



A NUMBER OF NEW MACHINES just put on the market by the Buffalo Forge Co. are described and illustrated in their new folder, catalogue No. 77. Among them are new designs of the Buffalo Forge No. 660 and Buffalo Geared Hand Blower No. 39. The change in construction of the latter places the high speed intermediate gear below the handle shaft, and hence under the oil bath, whereas, previously, depended on a "splash" indication. The booklet also shows the No. 202 Electric Blower, which is Electric Driven combined with Hand Power also Direct Drive Blower No. 306, which is a new delivery gear pattern with a special design of clutch, avoiding the old style ratchet.

TWO OF OUR ADVERTISERS have recently changed their addresses. The Hawkeye Mfg. Co., formerly of Tama, Iowa have moved to Cedar Rapids, Ia., and the Hathorn Foundry & Machine Co. have taken new quarters at 1206 N. 71st Ave., Chicago, Ill.

THE DAYTON ELECTRICAL MFG. CO. of Dayton, Ohio, have recently issued a revised edition of their Bulletin No. 1, which describes their well-known Apple Ignition System, and gives automobilists and gas-engine users valuable information in regard to both touch and jump spark ignition. This book is much more complete and interesting than the average trade catalog, and contains information which can be had from no other source. It is a valuable manual to have in your possession. We would advise all our readers to write for a copy, which shall be sent free of charge.

FOR THE PURPOSE OF BRAZING retaining wires on rubber tires, the Turner Double Jet torch is said to produce the maximum amount of heat and will quickly braze the joints without vulcanizing the rubber. The burner is controlled by two needles, allowing the operator to obtain a large flame or small pointed flame. It is made and sold under the makers' guarantee, is extremely popular with the trade and has become the standard article with jobbers, who sell at factory prices.

THE WILLIAMSPORT GAS ENGINE CO., Williamsport, Pa. advise us that they will gladly send to AMERICAN BLACKSMITH readers, upon request, one of their handsome 1907 calendars. These calendars are well worth writing for.

Little Giant

IT'S A PLEASURE

to work with Little Giant tools with their keen cutting edges. We make screw plates, taps, and dies that excel all other brands in quality, durability and accuracy.

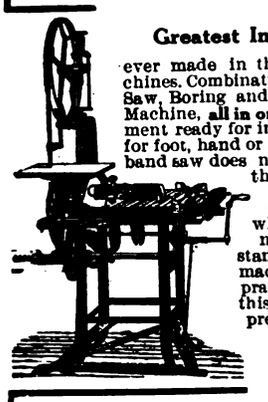
Why don't you write for our Catalogue showing all styles of Little Giant tools? We will gladly send one to you free.

WELLS BROS. CO.
GREENFIELD, MASS.

New York Store, 56 Reade St. London Store 149 Queen Victoria St.

Little Giant

PARKS
Ball Bearing
MACHINERY

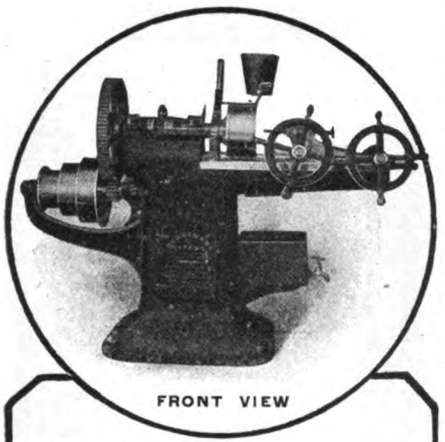


Greatest Improvement

ever made in this class of machines. Combination Rip Saw, Band Saw, Boring and Spoke Tenoning Machine, **all in one.** Each attachment ready for instant use, either for foot, hand or belt power. The band saw does not interfere with the circular saw, the operator stands at the side while the man running the rip saw stands in front of the machine. The new practical features of this machine are appreciated by every customer.

CATALOGUE FREE
ALSO INTERESTING PRICE LIST
WRITE TODAY TO
PARKS BALL BEARING MACHINE CO.
1501-07 Knowlton
CINCINNATI, OHIO.

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FRONT VIEW

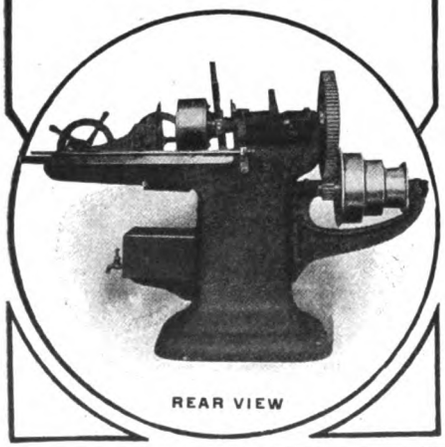
A Bolt Cutter is much like a man in this: THE HEAD is nearly everything.

The Merriman Bolt Cutter Head is Noted for—

1. SIMPLICITY OF THE HEAD: Only Four Parts, consequently,
2. GREAT DURABILITY. Few repairs needed.
3. SQUARE BEARING OF THE DIES IN THE RING; consequently,
4. SOLIDITY OF THE DIES LIKE A SOLID DIE; consequently,
5. UNIFORMITY OF THE PRODUCT; Bolts all the same size,
6. EFFECTIVENESS OF OPERATION; Cheapest Help can understand and Run it,

SEND FOR CATALOG No. 11.

The H. B. Brown Co.
EAST HAMPTON, CONN.



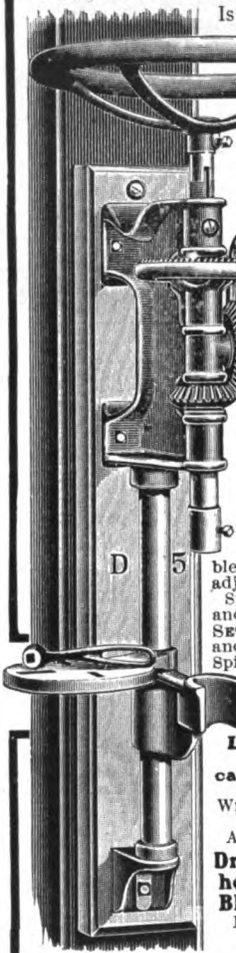
REAR VIEW

Little Giant.

A SIGN OF
Strength and Quality

The "Little Giant" Drill Press

Is a strong, serviceable, compact and thoroughly well made machine and like all other "Little Giant" machines, is **Fully Guaranteed to give perfect satisfaction**



GENERAL DIMENSIONS

Drills to one inch diameter hole. Drills to center of 14-inch circle. Swinging Table (either side). Easily adjusted to height.

Spindle is made of steel and has TOOL STEEL SET SCREW hardened and tempered.

Spindles are made to receive ½ inch or ⅝ Shanked Twist Drills.

Leading Dealers Everywhere carry "Little Giant" Machines.

Write for our complete Catalogue—Free.

A Complete line of **Drills, Vises, Bolt-headers, Swage Blocks and Mandrels** Fully Illustrated and Described.

Send name and address today for Catalogue.

B. B. NOYES & CO.
Greenfield, Mass., U. S. A.



STEEL WRENCHES
Drop-Forged, Semi-Finished

Take nuts for ⅛ to ½ inch bolts. Full set of 5 wrenches by express, $1.50. Sample ¼ x ⅛ by mail 25c. Write for catalogue containing useful information.

HANDY TOOL CO., 125 BELLEVUE, OHIO

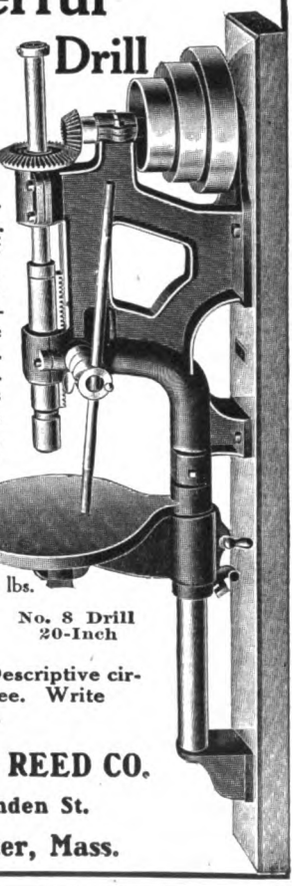
"The Australasian Coachbuilder & Wheelwright."

A Monthly Illustrated Technical Journal circulating amongst Coachbuilders, Wheelwrights and Blacksmiths throughout the Commonwealth of Australia, New Zealand and South Africa.

Advertising and subscription rates on application to

J. E. BISHOP & CO.,
65 MARKET STREET,
Sydney, Australia.

Powerful 20 in. Drill Lever Feed

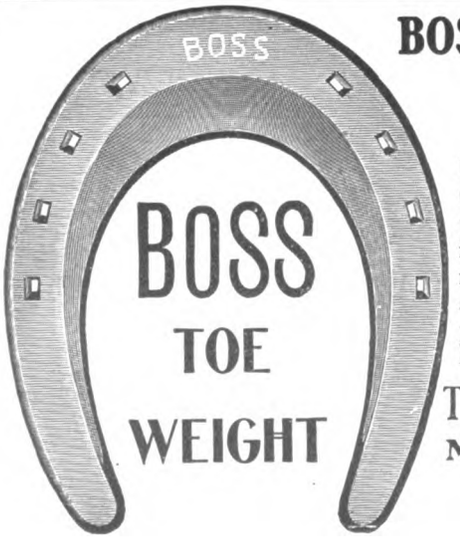


Will drill to centre of a 20-in. circle. Run of spindle, 8 in. Run of table, 12 in. Size of spindle, 1½ in. Size of table, 15 in. Size of post, 2 in. Drill socket takes 41-64-in. Size of cone pulleys, 6¾, 8½, 10½ in. Tight and loose pulleys, 8 x 3 in. Total weight of machine, 380 lbs.

No. 8 Drill 20-Inch

Interesting Descriptive circulars sent free. Write for price list.

FRANCIS REED CO.
43 Hamden St.
Worcester, Mass.

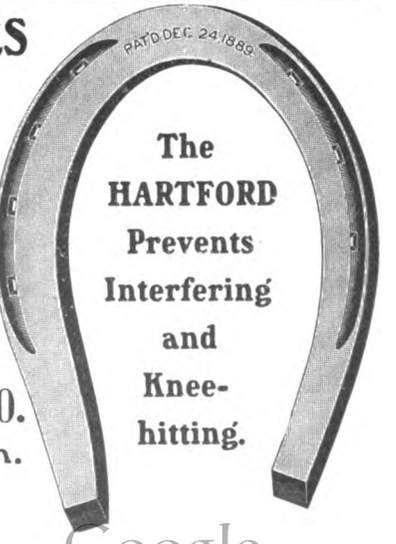


BOSS AND HARTFORD SHOES

CARRIED IN STOCK BY ALL LEADING DEALERS

Have the highest reputation among the trade. Conceded to be the best sideweight and toeweight shoes made in this country. Cost same as inferior makes. Mean less labor. Are far superior to a hand made shoe and always give good satisfaction. Sold by all leading jobbers. Sample pair sent post paid for 50 cents. Send for circulars. They are free.

THE SIDEWEIGHT HORSESHOE CO.
Mechanic Street, Hartford, Conn.



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OAK WAGON SILL

1⅝ in. x 8 in., 8 cents per lineal ft.; 1⅝ in. x 3½ in., 9 cents per lineal ft.; 1⅝ in. x 4 in., 10 cents per lineal ft.
All sizes in two foot lengths up to 16 feet.

TURNED HICKORY AXLES

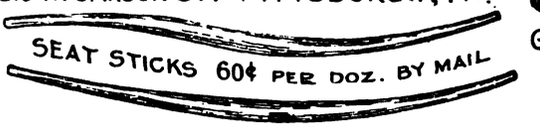


The above are all rear axles and are used for front by cutting center offset out. Ends are not fitted to any make skein, but are left full in order that enough wood may be had to fit to all skeins.

THE ENTIRE LENGTH IS FIVE FEET, SEVEN INCHES

For Skein	Price Each	For Skein	Price Each
2 3-4 in.	$1.15	3 3-4 in.	$2.00
3 in.	1.30	4 in.	2.25
3 1-4 in.	1.50	4 1-4 in.	2.50
3 1-2 in.	1.75	4 1-2 in.	2.75

F. F. BOWN MFG. HOUSE
1216 W. CARSON ST. PITTSBURGH, PA.



SEAT STICKS 60¢ PER DOZ. BY MAIL



GEAR SPOOL
75¢
PER SET OF 6
BY MAIL.

PROMPT SHIPMENT FOR CASH

THE BARLOW HARDWARE CO.
CORRY, PA.
Carry a complete line of Horseshoers' Supplies, Wagon and Carriage Material
Write for Our Complete Catalogue of Blacksmith Supplies.



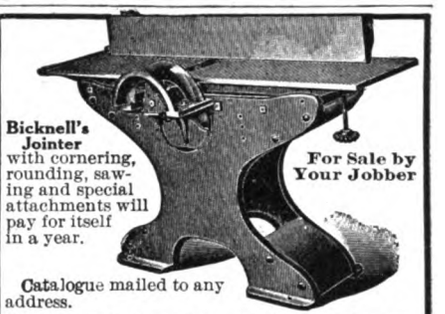
BE A RAILROAD MAN
and earn from $75 to $185 per month
We teach you by mail for position of
BRAKEMAN OR FIREMAN
Our instruction is practical; endorsed by railroad managers, and qualifies you for immediate employment. Instructors are all prominent railroad officials. Write for catalog. Begin study at once.
Wenthe Ry. Corr. School, Dept. 688 Freeport, Ill.

OUR JANUARY OFFER

A DOLLAR STORM FRONT

To introduce our 20 to 24 oz. adjustable Storm Front and Dust Hood combined, we will ship one **prepaid** to any address in the U. S. upon receipt of $1.10 in cash. Will fit the open front of any ordinary Hood. Retail for $1.75 to $2.50, a net profit of 60 to 80 per cent. to you for handling.
Are you looking for something new? LET'S SHIP YOU ONE.

The Ideal Storm Curtain Co.,
Manufacturers of Adjustable Storm and Side Curtains, Dust Hoods, Top Aprons, Etc.
Box 424 McPHERSON, KAN.



Bicknell's Jointer with cornering, rounding, sawing and special attachments will pay for itself in a year.

For Sale by Your Jobber

Catalogue mailed to any address.

BICKNELL MFG. & SUPPLY CO.
JANESVILLE, WIS.



THE TOMLINSON ANVIL PUNCH

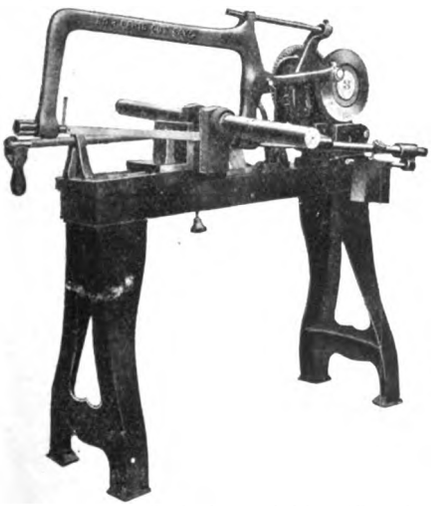
PUNCHES ROUND or SQUARE HOLES
In iron or soft steel ½-in. thick, or ¼-in. crucible steel. It is the most practical Punch in use and costs two-thirds less than any other punch. It's boss for plow and lister shares, blade steel and cultivator shovels.
Every hole you need can be punched five times faster than drilling.
8 Dies and 8 Punches packed with Punches in each shipment.
SEND FOR CIRCULAR AND PRICE LIST.

TOMLINSON PUNCH CO., SEVERY, KANSAS

Trade Literature and Notes.

ONLY A FEW YEARS AGO did the blacksmith really begin to appreciate the advantages of power in the shop. Since that time thousands of AMERICAN BLACKSMITH readers have installed engines and their trade has increased rapidly, for with power they are doing better work in less time. The Robertson Mfg. Co., of Buffalo, N. Y., have supplied many or our readers with high class engines and our attention was recently directed to the splendid line of power saws this concern is now manufacturing. Improvement of the shop equipment should not stop with the installation of power for there are many power machines that go hand in hand with the engine as labor savers and money makers.

The Robertson Rapid Cut Power Saw is undoubtedly a very valuable machine for the shop. With it the smith can do all his bar steel cutting besides cutting off shafts true and without loss of material. No heating is necessary; after the cut is started no further attention is required. The accompanying illustration shows the Robertson No. 3 machine cutting the center or wrist pin opening between the arms of a gas engine crank shaft. These cutting off machines are made in eight different sizes. The Robertson saw is very popular, having proved

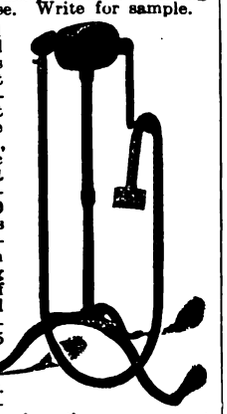


its efficiency to all who have tried it. All readers who are interested in these fine machines can secure an interesting descriptive booklet free by addressing The Robertson Mfg. Co., Buffalo, N. Y.

ATTENTION IS CALLED to the advertisement of The Phillips-Laffitte Company on page 70 of this issue. This firm recently published an attractive booklet entitled, "Do You Make Your Blacksmith Shop Pay", and offers to send a copy of this to any American Blacksmith reader upon request.

This company also offers to send each writer a sample of the well known Laffitte Welding Plates so as to give the smith an opportunity to test the value of these plates before investing any money in them. In many of the best blacksmiths shops in the country Laffitte Welding Plates are in constant use. Write for sample.

THE STEWART No. 1 clipping machine illustrated here has many features that place it in the front ranks of the clipping machines on the market. It is manufactured by The Chicago Flexible Shaft Co., and confidence is at onec inspired in it from the fact that the driving mechanism is guaranteed for 20 years. The manufacturers claim that this new machine is without exception the most perfect clipping machine, regardless of price, ever manufactured by any one. Its production is the result of 15 years of experience in the manufacture of high grade clipping machines. The gears are all enclosed in a dust-proof box where they are constantly bathed in oil thus reducing friction and wear to the lowest point. A new style of flexible shaft is used, producing the light running and weighing only half as much as the ordinary shaft The height of the machine over all when set up is 39 inches. The weight is 36 lbs. and it can be so packed as to be easily carried about from place to place. The dimensions of the shipping box are 14¼ by 12 by 7 inches. Descriptive circulars will be sent free. Address Chicago Flexible Shaft Co., 126 La Salle Ave., Chicago, Ill.



THE "WIZARD" Tubular Magneto, made by The Hercules Electric & Mfg. Co. of Indianapolis, Ind., is enjoying unusual popularty among the trade. Owing to its high electrical efficiency and clever mechanical construction the "Wizard" has won favor everywhere. Readers are sure of a fair deal when the manufacturer offers to send this magneto on a 30 day free trial in your own shop, and then if it does not fill every requirement you can send it back. Detailed information may be cheerfully obtained by addressing this firm as above.

"PRACTICAL LETTERING WITH ORIGINAL SYSTEM FOR SPACING" by Thomas F. Meinhart. Fifteen pages, 14 x 9 inches with three full-page plates. The Norman W. Henley Publishing Company, New York. Price 60 cents.

The author explains a system of lettering which he has developed for spacing letters so as to produce a uniform optical effect. While the solution of this problem requires a mechanical scale, it is expected that the eye will gradually become trained to see letters with correct optical spaces from habit. The pamphlet is espccially useful to draftsmen, sign-painters and all having to do with lettering.

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WILL YOU, MR. IRREGULAR READER, ALLOW

TWO CENTS

PER WEEK TO STAND BETWEEN YOU AND INCREASED EARNINGS?



IF an investment of two cents a week would save or make many dollars for you, would you jump at the chance? If it would give you such craft information as would increase your earning capacity, would you invest a dollar? Of course you would.

We want to send you The American Blacksmith regularly every month. We send this copy to give you an idea of the paper—but we want to continue sending it. Will you allow us to do so? Will you invest two cents per week?

THE AMERICAN BLACKSMITH contains hundreds of sound, practical and valuable money-saving and money-making articles written by trade experts. It gives you every month, information that will help you solve your daily trade problems, to increase your profits, to improve your business, to do work better, faster, cheaper—in short, a thousand and more items, articles, hints, kinks and formulas of vital interest to you as a craft worker. The American Blacksmith is the acknowledged authority in the smithing craft, enabling you to keep in touch with the latest in smithing circles.

Read what the American Blacksmith did for Willis Spence, of Chester, South Carolina: "I was receiving $1.75 per day of 10 hours, and am now offered $5.00 per day of 8 hours. This I consider was accomplished by reading The American Blacksmith and paying strict attention to instructions." What has been done, can be done again, and why not for you?

We offer to send you the American Blacksmith twelve times a year for one dollar. This is less than two cents per week—can you afford to do without it at this slight cost?

Send in your order for a year's trial now—today. You may forget it tomorrow. Therefore send it **at once,** and get one of the following premiums to repay you for your promptness.



PREMIUM No. A. This consists of a complete rubber stamp outfit. The stamp can have two lines on it, your name and address, as

JOHN A. CARTY,
EDEN, N. Y.

A pad in a neat box furnished for inking the stamp. It is a mighty useful little outfit. With it you can sign your name neatly and quickly on letters, bills, envelopes, etc.

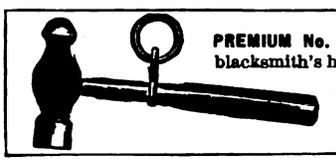
PREMIUM No. B.



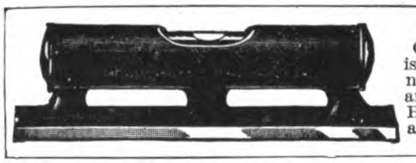
This cut shows our hoof knife, Heller Bros.' make, wood handle, about 10 inches long. Made of crucible steel and carefully tempered. A serviceable tool.

PREMIUM No. C. This watch charm is a neatly finished model of a monkey wrench. In spite of its small size, 1¾ in. long, it works just like a big wrench the jaws opening ¼ inch.





PREMIUM No. D. This is a miniature blacksmith's hammer watch charm. It is 1¾ inches long and highly polished. A nice charm for a smith.



PREMIUM No. E. Our bench level is 3¼ inches long, neatly finished and very accurate. Handy to have around.

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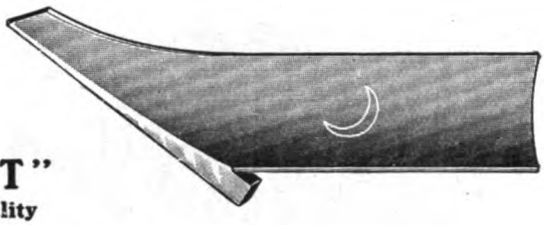
We will also send you one of those mighty handsome 1907 calendars, entitled, "The Old, Old Story," if our supply is not exhausted when your order is received, So send your order now before you lay aside the paper and forget.

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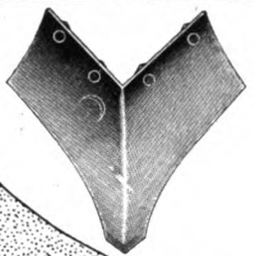
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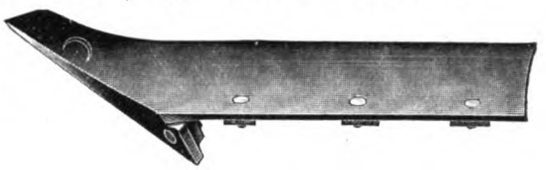
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THE MACMILLAN COMPANY, of New York, have published a valuable addition to existing electrical literature, being Volume One of the "Elements of Electrical Engineering," written by Prof. Wm. S. Franklin and Prof. Wm. Esty of Lehigh University. This treatise represents the combined experience of the authors extending over a period of thirteen years, their aim being to give a clear, concise treatment of the subject. The book is rather technical in its nature, but it's clear and straight-forward treatment of the subject in hand will commend itself to those who are interested in electrical engineering. A list of carefully chosen problems is an important feature of the book. This volume is devoted to direct current machines, electric distribution and lighting, the chapter headings being as follows: Elementary Electricity and Magnetism; The Dynamo; The Operation of the Dynamo as a Generator; The Operation of the Dynamo as a Motor; Power Losses in Generators and Motors, Efficiency; Ratings and Guarantees; The Practical Operation of Dynamos. Station Equipment; Storage Batteries Electric Distribution and Wiring; Photometry and Electric Lighting Electromagnets; Magnetism of Iron; Characteristic Curves; Armature Windings; Problems. The price is $4.50.

"PROCEEDINGS of the Fourteenth Annual Convention of The National Railroad Master Blacksmiths' Association," 200 pages. Published by Secretary A. L. Woodworth, Lima, Ohio.

The annual report of The Railroad Master Blacksmiths' Association shows that this body is more active than ever. The report is of practical worth, as well as of interest as the proceedings of the association.

"THE STEEL SQUARE POCKET BOOK" by D. L. Stoddard, 159 pages, illustrated. Industrial Publication Company, New York. Price, 50 cents.

This little book now in it's second edition is a handy, practical, pocket-sized treatise on the better methods of using the steel square. It contains directions for finding the various cuts used in roof, stair and tower building, besides methods for describing hexagons, octagons, etc. It helps solve the wood-workers problems, and is written in plain, understandable language. The book also contains an alphabetical index thus making it valuable for ready reference.

"THE STEEL SQUARE AS A CALCULATING MACHINE" by Albert Fair. 81 pages, illustrated, cloth. Industrial Publishing Company, New York. Price, 50 cents.

The object of this little book is to explain the many uses of the steel square, and the principle upon which it works. The explanations are full, clear, and simple and to anyone using a steel square this treatise is practical and useful. The steel square can be made to solve some very difficult problems and this book tells how.

"ROPP'S NEW COMMERCIAL CALCULATOR" by Christian Ropp. 160 pages. C. Ropp and Sons, publishers, Chicago. Price 50 cents, leather.

A new edition of an old work containing calculations, rules and tables on everything from cotton to coal. There are numerous items of value and interest and after a careful study of the full contents of the book it will undoubtedly prove most valuable.

"TURNING AND BORING TAPERS," by Fred V. Colvin. 25 pages illustrated. The Derry-Collard Company, New York, publishers. Price, 25 cents.

The first of the Derry-Collard Practical Papers and now in its second edition. It is plainly written, explanations of various ways of designating tapers, with several tables and the tapers mostly used. It also shows how to use the compound rest.

"BRAZING AND SOLDERING," by James E. Hobart. 32 pages, illustrated. The Derry-Collard Company, New York, publishers. Price, 25 cents.

This phamphlet is number five of the "D-C." monographs and tells the how, the why and the wherefore of both brazing and soldering. It shows the tools to use, how to make and how to use them.

"SWITCHBOARDS" by Wm. Baxter, Jr. 186 pages, illustrated. The Derry-Collard Company, New York. Price, $1.50.

The misson of this book is to cover all sizes and kinds of switchboards from the single dynamo in the engine room to the largest power plant. It includes divert and alternating currents; oil switches for high tension; lighting; railway work and everything pertaining to switchboards except telephone work.

"TOOLS FOR MACHINISTS AND WOODWORKERS, including modern Instruments of measurement" by Joseph G. Horner. A. M. I. Mech. E. 332 pages, illustrated. The Norman W. Henley Publishing Company, New York. Price $3.50.

The tool-using machinist and woodworker will find in this book a description and classification of cutting, shearing, scraping, sawing, milling, drilling and boring tools and their hardening, tempering and grinding. It also includes tools for measuring, testing, and leveling surface plates, dividers, calipers, gauges of all kinds, indicators and templets. The illustrations with which the work is well supplied are excellent.

"PRACTICAL METAL TURNING," by Joseph G. Horner, A. M. I. Mech. E., 400 pages, illustrated. The Norman W. Henley Publishing Company, New York. Price, $3.50.

This is a practical book for the machinist and covers in a comprehensive manner the machining of metal parts in the lathe. It covers the design, use, tools, attachments, work, and operations of the modern lathe. The turret lathe and the modernized engine lathe are also fully explained. Turning, centering, driving, drilling, boring, screw cutting, grinding, measuring and all the various metal turning operations are fully and comprehensively explained.

"MODERN MILLING MACHINES" by Joseph G. Horner, A. M. I. Mech. E., 300 pages. illustrated. The Norman W. Henley Publishing Company, New York. Price $4.00.

The milling machine is an important factor in American manufacture and it therefore follows that a practical book on the subject of milling machines is of value. Mr. Horner describes and illustrates the milling machine and its work in a plain, clear manner, gives its history and development, describes its design construction and operation and in short covers the subject thoroughly.

"PUNCHES, DIES AND TOOLS FOR MANUFACTURING IN PRESSES," by Joseph V. Woodworth, 467 pages, illustrated. The Norman W. Henley Publishing Company, New York. Price, $4.00.

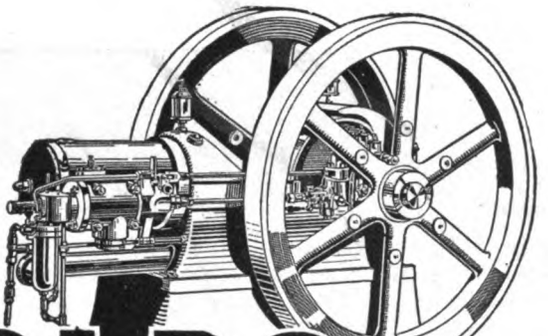
The author of "Hardening, Tempering Annealing and Forging of Steel" has in this, his latest book given the technical world a practical work on die making and sinking, punch making and sheet metal working. He also explains the making of special tools, combinations and the compressing and assembling of sheet metal parts. Among the chapter headings are "Processes and Tools for making Rifle Cartridges, making and using Dies for Drawing Wire and Bar steel; making Pins, Pens and Needles," etc.

"PLAIN GAS ENGINE SENSE" by E. L. Osborne, Second Edition, 150 pages, illustrated. Price 50 cents.

The second edition of this little book has already made its appearance. The author covers the field of gas engine operation for the beginner and unprofessional operator and presents the matter in a plain and easily understood manner. The book is pocket size and is just what the operator of a small power unit requires. Copies of the new edition may now be obtained from The American Blacksmith Book Department. P. O. Drawer 974, Buffalo, N. Y.

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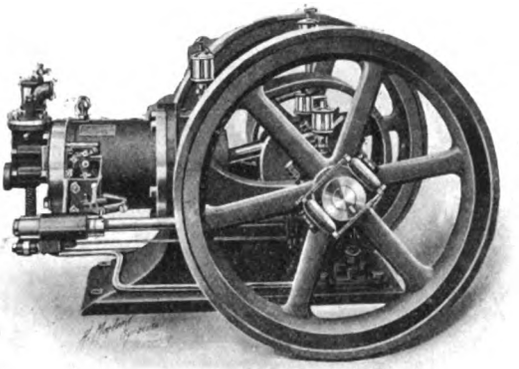
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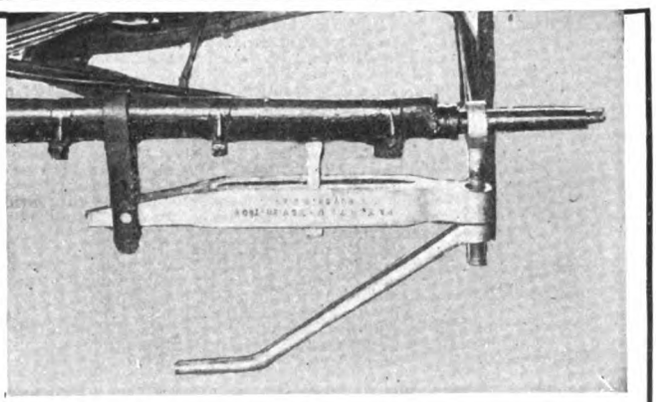
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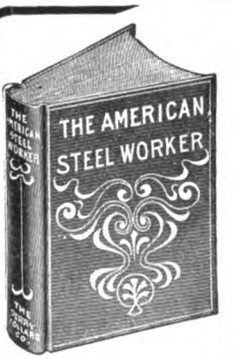
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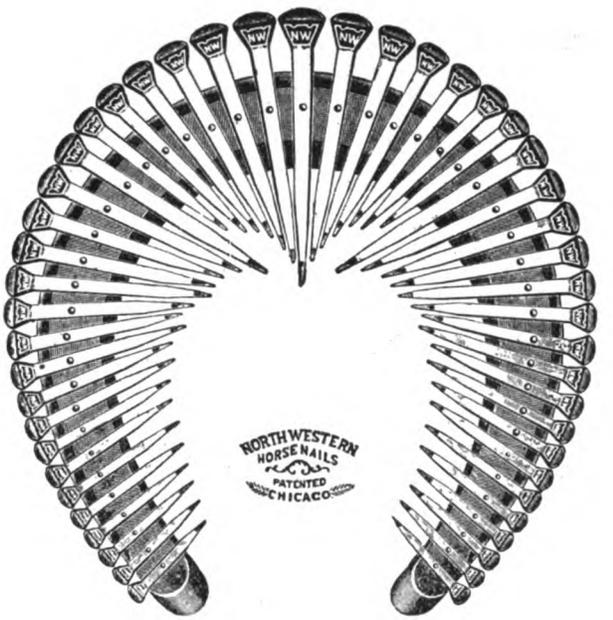
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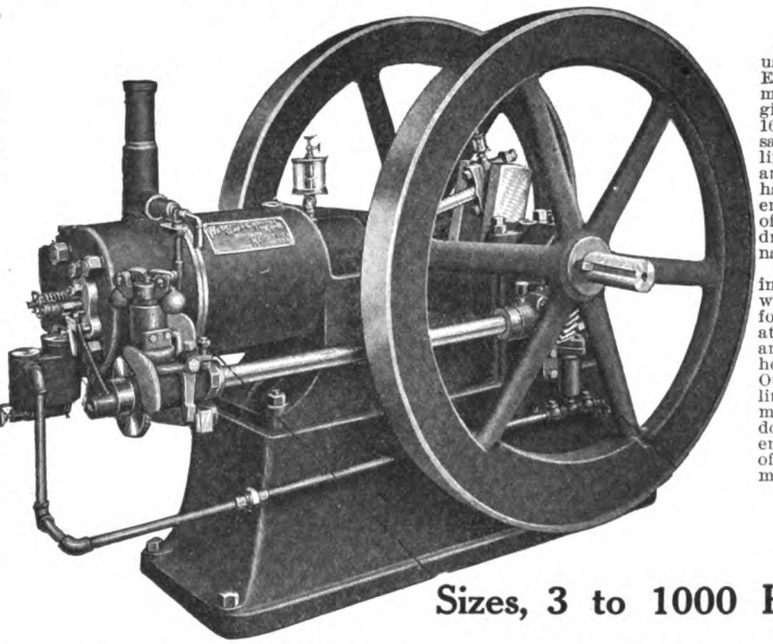
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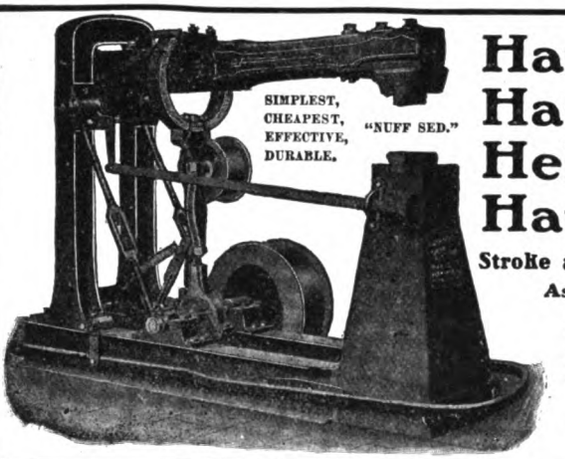
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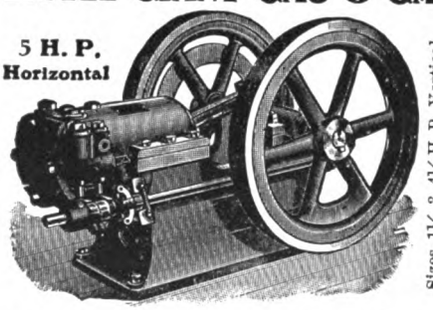
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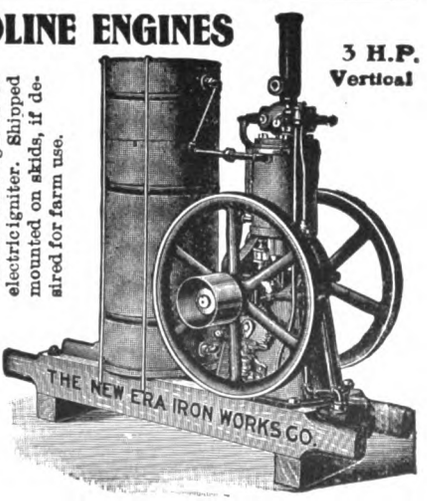
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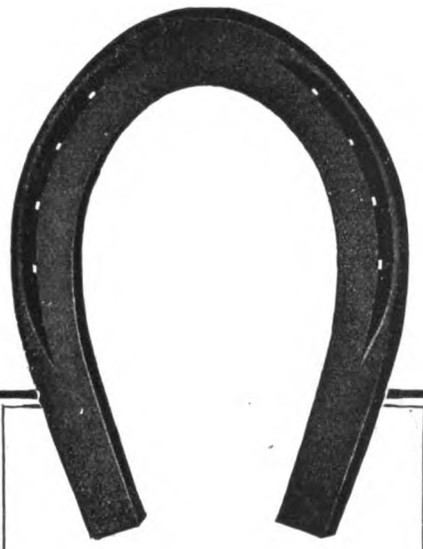
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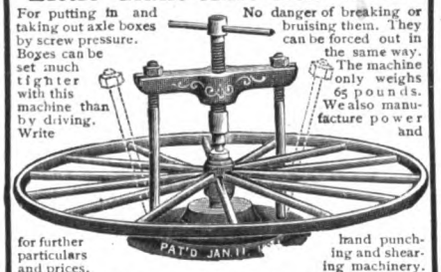


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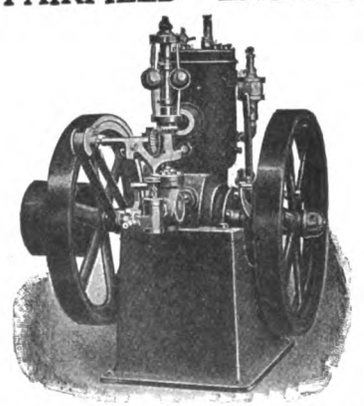
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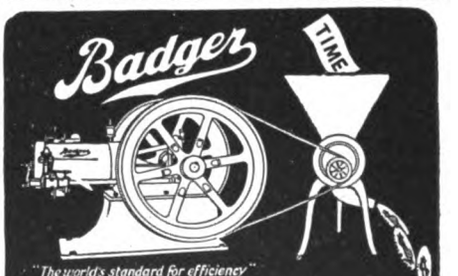
With or without legs.

Cuts ½ x 2 in Flat ¼ to ¾ in. Round Punches ⅜ in. hole in ⅜ in. stock; ½ in. hole in ¼ in. stock.

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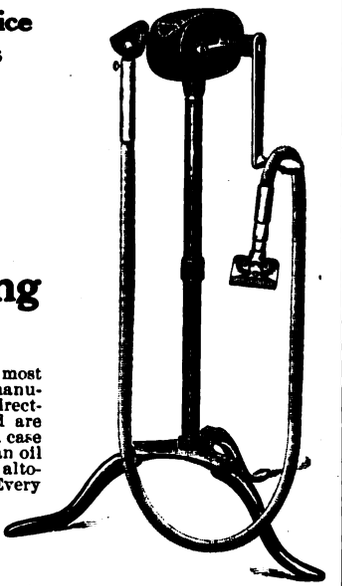
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It has 6 feet of new style light easy running flexible shaft and is fitted with the highest grade Stewart one nut balance pressure clipping knife. It runs easiest of all clipping machines and clips very fast.

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THE IMPROVED EASY HOOF TRIMMER

DIMENSIONS.—Weight, 2 lbs., Length, 12 ins., Opens 2 ins., Cuts 1 in. **OUR GUARANTEE.**—If you don't like it you can return it and get your money. **Directions for Using.**—First—Hold the foot in the ordinary manner and remove soft parts from bottom with your toe knife; then with the trimmer begin at the heel and cut down and around the toe and back on the other side, removing the part at one cut and in one piece. Second.—Avoid all wrenching or prying. Hold the tool as near upright as you can. Cut straight through to the blank jaw regardless of nails or other obstructions, and with very little leveling with the knife or rasp your job is complete.

THIS TOOL has been rightly named because it is EASY to adjust, EASY to sharpen, and EASY to convince a horse shoer that it will cut a hoof down easier quicker and better than any tool he ever saw. It has a detachable knife that can be removed or replaced in a moment. The knife jaw is adjustble by means of screws. When the knife becomes shorter by sharpening, give the screw a turn or so and the reins will go back to the proper distance apart. When knife wears out it can be replaced for a few pence.

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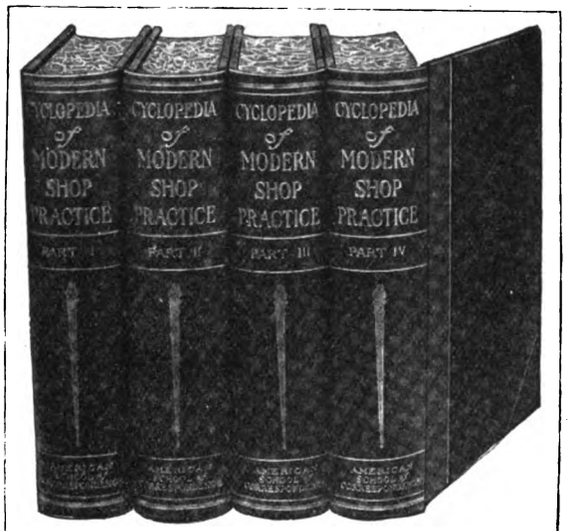
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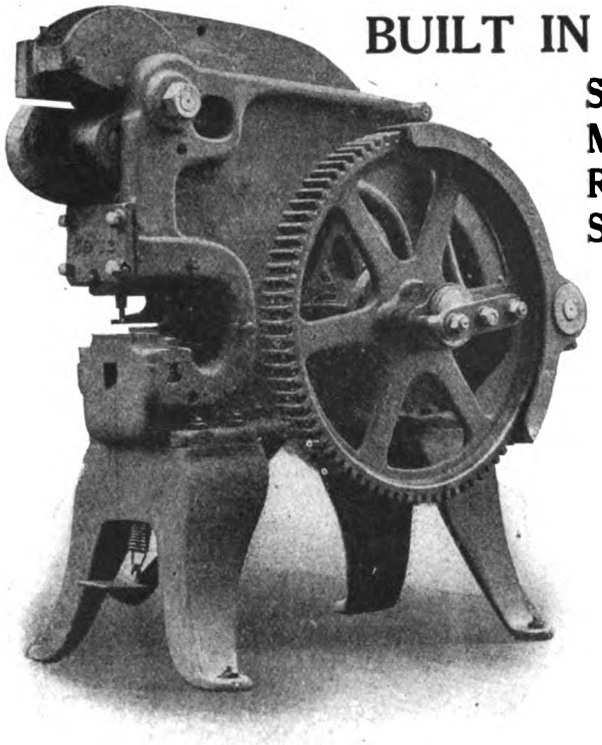
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Mention The American Blacksmith, Jan. '07.

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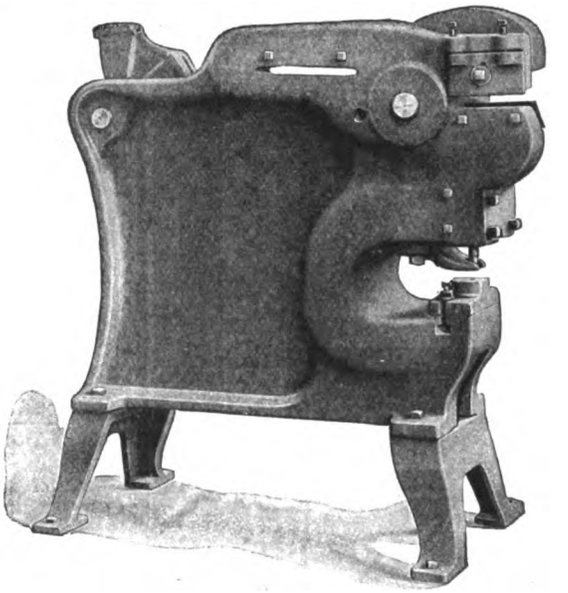
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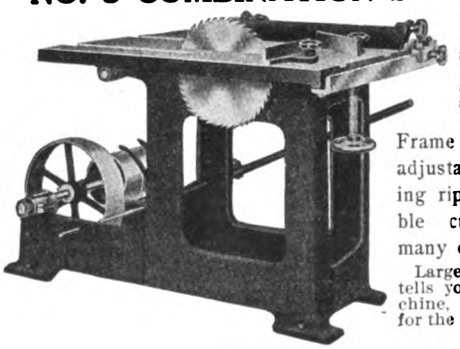
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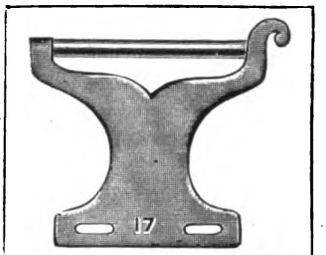
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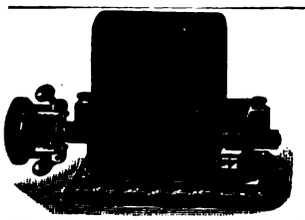


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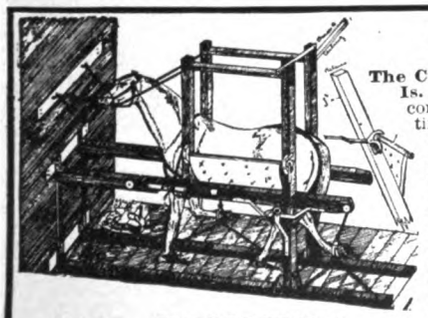


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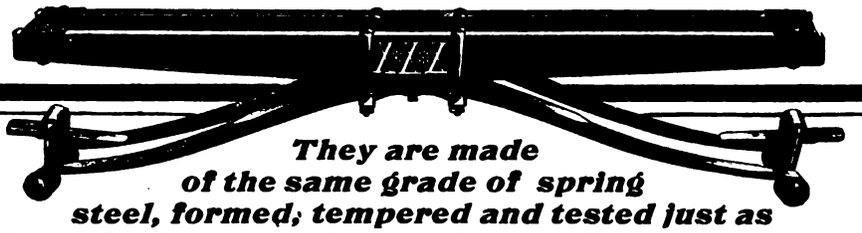
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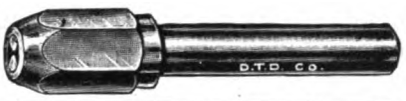
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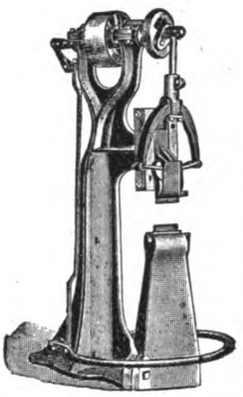
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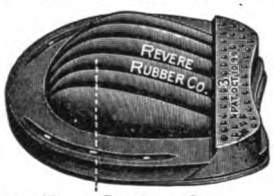
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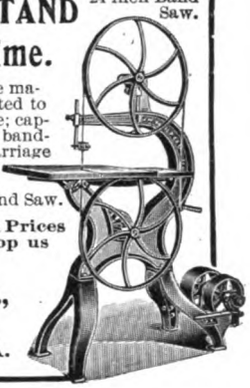
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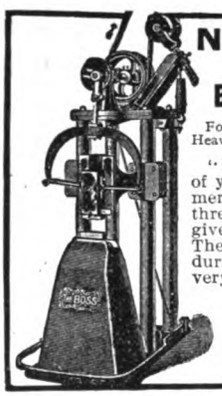
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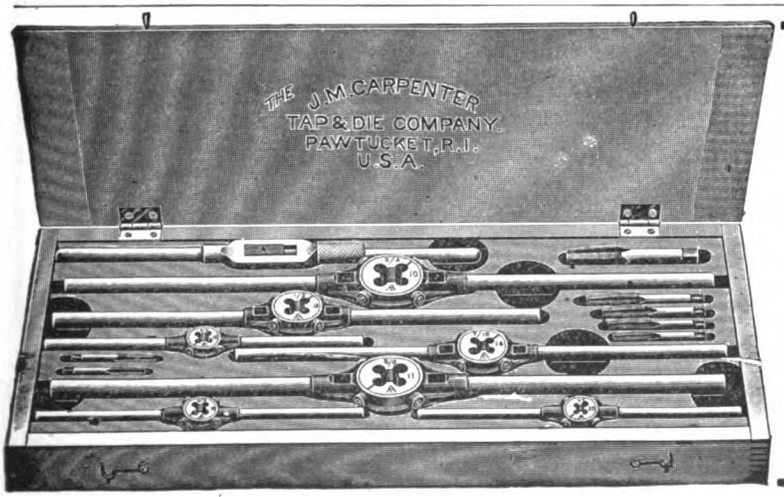


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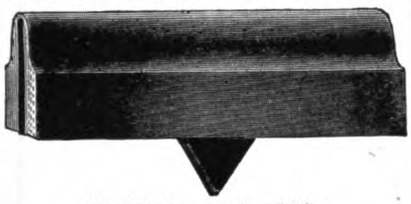
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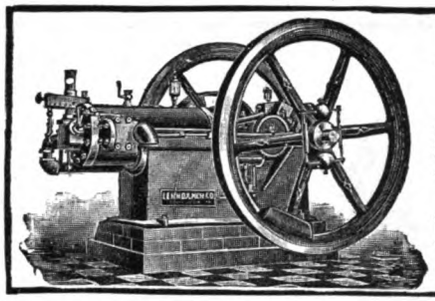
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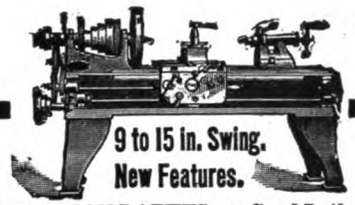
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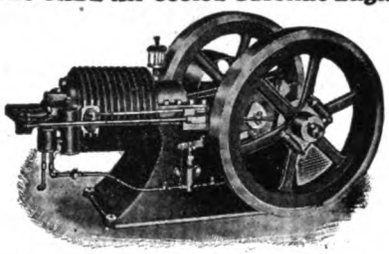
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Made in 2, 3 and 6 horse power sizes. What's the use of paying good money for an old style engine, when you can get something better in the "Gade Air Cooled" at the same cost Buy one. It will not freeze up or go back on you in cold weather. It's ready for business all the time. We know it will please. By all means write for descriptive circulars and price list of the "Gade." Address, GADE MFG. CO., Iowa Falls, Iowa.

THE WATERLOO BOY

Our Blacksmith's Special

3½ to 4 H. P.

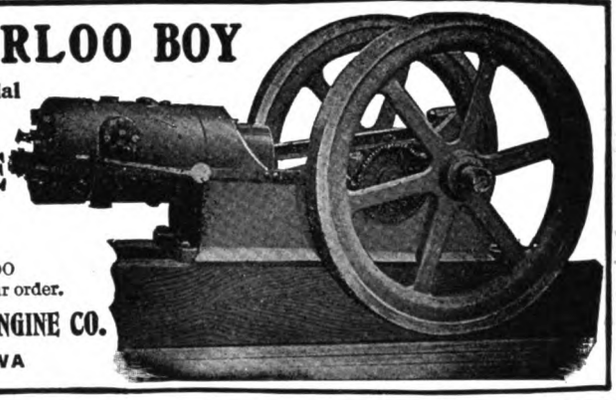
GASOLINE ENGINE

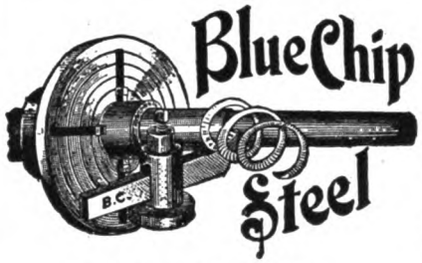
The Engine Is Right!
The Price Is Right!

Investigate the WATERLOO before placing your order.

WATERLOO GASOLINE ENGINE CO.

WATERLOO, IOWA





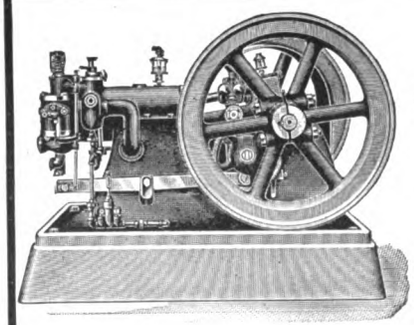
Will turn off blue chips on any kind of work.

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THE ALAMO
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The ideal power for shop or farm. Economical of fuel. Easy to start. Speed regulated while in motion. Built on advanced lines. Satisfactory wherever installed. Send today for Catalog A—FREE—full of information.

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HILLSDALE, MICH.

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HORSESHOERS, ORGANIZE!



THE ROWE PATENT CALK COMPANY, in confining its sales exclusively to horseshoers, depends for its business largely upon its recognition by horseshoers as their friend and protector.



This recognition amounts to little if horseshoers do not have an organization through which they can keep thoroughly posted upon the action of calk manufacturers, and through which they can reward those manufacturers who truly sell only to horseshoers.

On the other hand, horseshoers, if unorganized, are at the mercy of any unscrupulous manufacturer of calks who may see fit to ruin the horseshoer's business to secure greater manufacturing profits.

We believe that the horseshoer is the legitimate retailer of all articles of horsewear and the appurtenances; and we further believe that in the long run three-fourths of the calk sales of the country will be made through horseshoers.

Consequently, our interests are identical with those of the horseshoers, and the greater the power of the shoers the more business we expect to get.

Therefore, we urge horseshoers everywhere to form local organizations, and to work in harmony upon all matters. There never was a time when the danger to legitimate horseshoers was so great as it is now, and it behooves every shoer to be up and doing.

There are several hundred organizations throughout the land, and their coming has always been followed by contentment and prosperity that the shoers had never before known. To those who dare, belong the fruits of the world, and the reader, whoever he may be, should begin the work of organization now.

Don't wait for your neighbors to start. Write us at once, and we will furnish you with blanks, full information and advice. Let the New Year mean a newer and brighter era for you, Horseshoers of America.

THE ROWE PATENT CALK COMPANY,

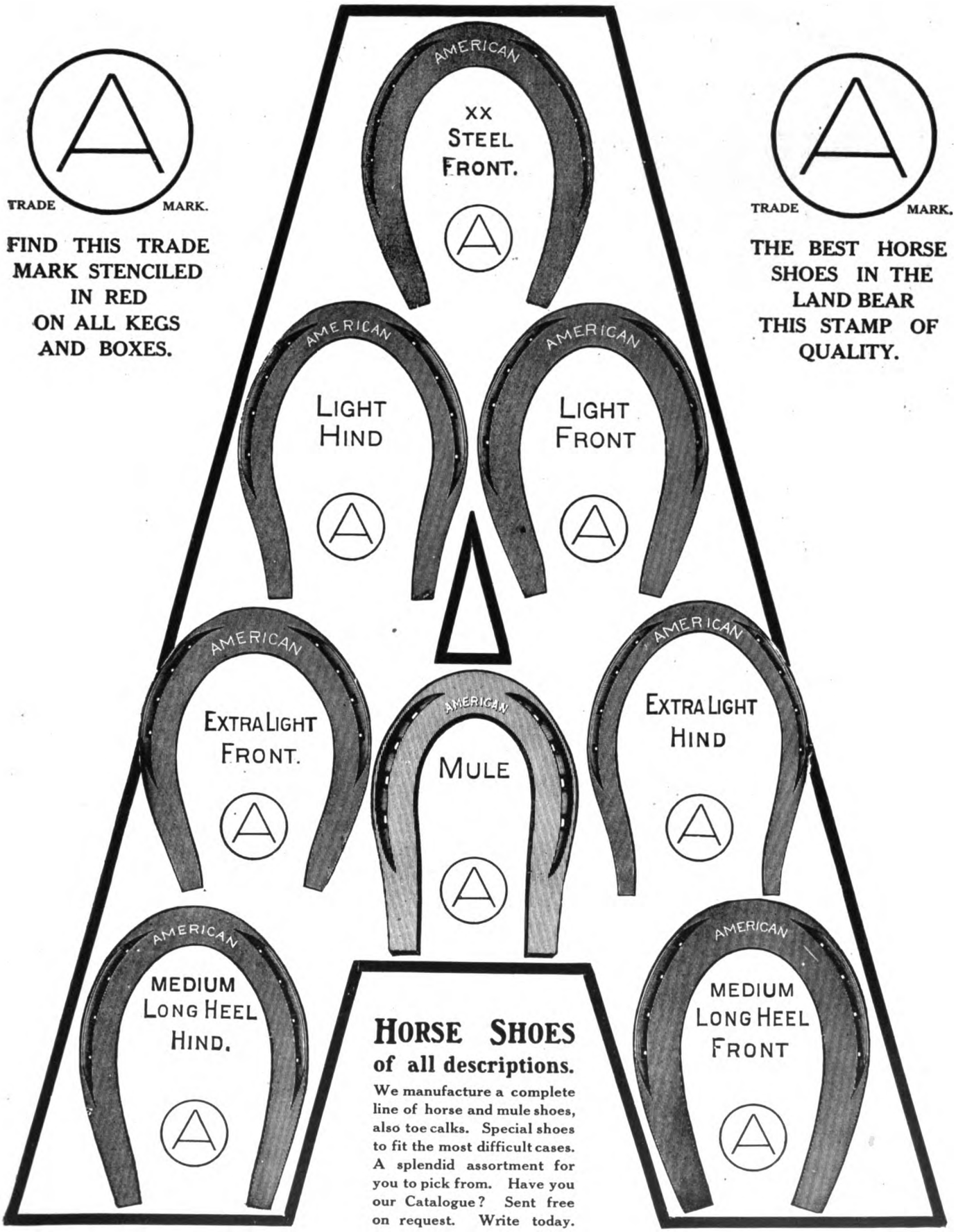
HARTFORD, CONN.

Send for free samples and descriptive booklet. We refund the money, if Rowe Calks do not wear longest.

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HORSE SHOES
of all descriptions.

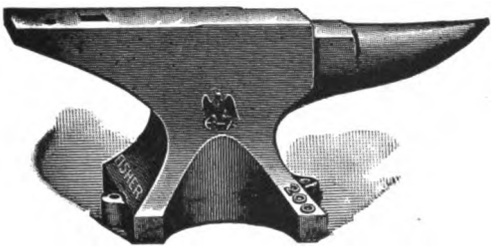
We manufacture a complete line of horse and mule shoes, also toe calks. Special shoes to fit the most difficult cases. A splendid assortment for you to pick from. Have you our Catalogue? Sent free on request. Write today.

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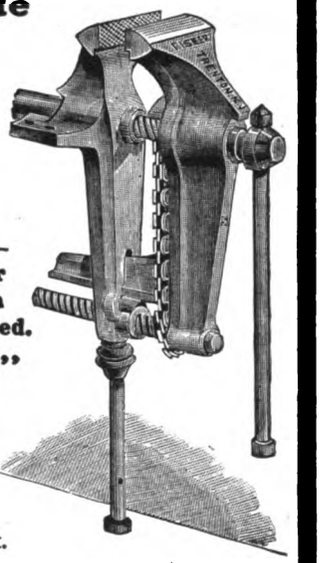
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"Fisher" Double Screw Parallel Leg Vise



Is sold by Reliable Dealers Everywhere. For Strength and Durability there are none better made. The "FISHER" is acknowledged the Best for Blacksmiths.

We have had over sixty years Experience in this line and offer you the most reliable Anvils on the Market. Every one Guaranteed.

WE BELONG TO NO TRUST--one blow on an "Eagle" anvil is worth two on any other anvil MADE

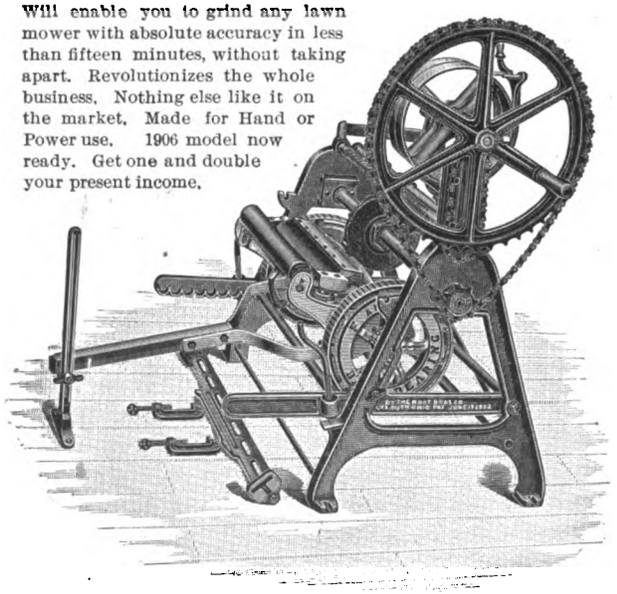
The Face Consists of a Single Piece of the Very Best Cast Steel Perfectly Welded and of the Hardest Temper. The Horn is made of Tough Untempered Steel and will neither Break nor Bend. All "Eagle" Anvils made with the Latest Fisher Patent Double Thick Steel on Both Edges of the Face. Made in all Shapes and Sizes up to 1300 lbs. Weight.

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Will enable you to grind any lawn mower with absolute accuracy in less than fifteen minutes, without taking apart. Revolutionizes the whole business. Nothing else like it on the market. Made for Hand or Power use. 1906 model now ready. Get one and double your present income.

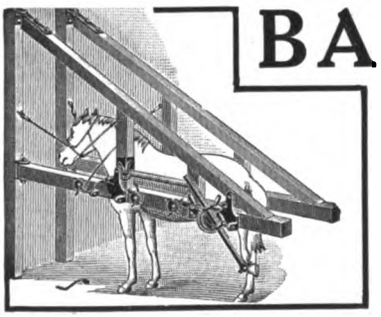


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BARCUS Horse Stocks



In use in all modern shoeing establishments, because they fill every shop requirement and give satisfaction everywhere. Everyone fully guaranteed. All the objectionable features of the cheap stocks eliminated.

BARCUS STOCKS are simple, strong, solid, safe and sure to hold. No ropes or pulleys to tangle or break; no bracing to roof or floor, but furnished complete ready to bolt to the stationary posts in your shop. You can rely on

Barcus Stocks Every Time.

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MR. GEO. BARCUS:—I wish to say that the horse rack we bought of you gives perfect satisfaction in all respects.

Yours respectfully, HODGINS & DOUGLASS.

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GEO. BARCUS & CO.,—Gentlemen: I have used one of your racks for three years and find it a fine thing. I have shod everything that comes from 700 pounds to 1900 and hold the large horse as well as the small one. Have handled horses that wiped out three to five shops and had no trouble handling the wildest of them as easy as the tamest. Would not be without it for twice the money. Your stocks are just the thing for you can lock the horse solid.

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Write for particulars.

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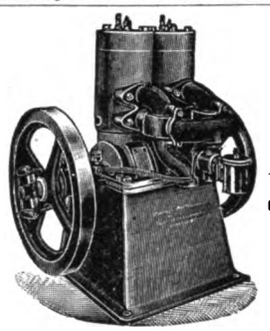
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The Maxwell & Fitch Gasoline Engine

Two cycle, a power impulse every revolution, we use no gears, cams, cam shafts, valves or valve springs, no engine can be simpler or more durable. If you want a well built engine, one built of the best materials, then just send us a postal for our catalogue and price list.

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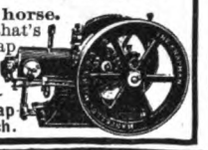
Send sketch or model for free examination and report as to patentability. Patents promptly secured. Advice and book free; terms low; highest references, and best service. Patents advertised free.

WATSON E. COLEMAN,
Registered Patent Attorney, WASHINGTON, D. C.

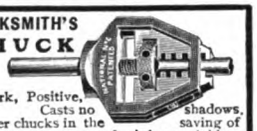
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DRILL CHUCK



Made entirely of steel, especially for blacksmithing and carriage work, Positive, strong and self-cleaning. Casts no shadows. Will save cost over other chucks in the saving of time. Money refunded if not as represented. Ask your jobber for it or send direct for prices and circulars. The best is the cheapest. The Oneida National Chuck Co., Oneida, N.Y., U.S.A.



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For Pumping, Cream Separators, Churns, Wash Machines, etc. FREE TRIAL
Ask for catalog—all sizes
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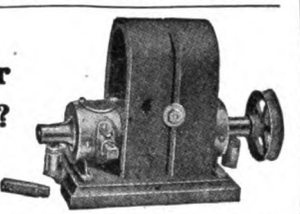
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the only practical lock neckyoke on the market. None better for safety and durability, Very handy for repair work. Have you tried them? Ask your jobber for them.
Descriptive circulars free.
THE ZIEGLER NECKYOKE CO., Coffeyville, Kas.

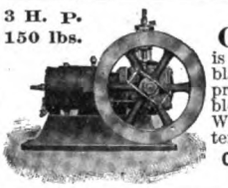
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"A Wizard Tubular" Does It.

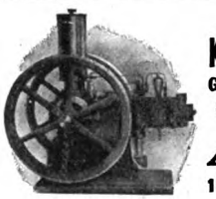


Armature incased in WATER-PROOF non-corroding brass tube.
All brass screws. Friction, Belt or Governor drive.
Brush-holders removed without loosening screws.
All parts polished brass. Contact and Jump Spark.
A TRIAL WILL CONVINCE YOU.
Most popular and satisfactory Magneto on the market.
Price as popular as Machine.
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Write for catalogue and SPECIAL OFFER.

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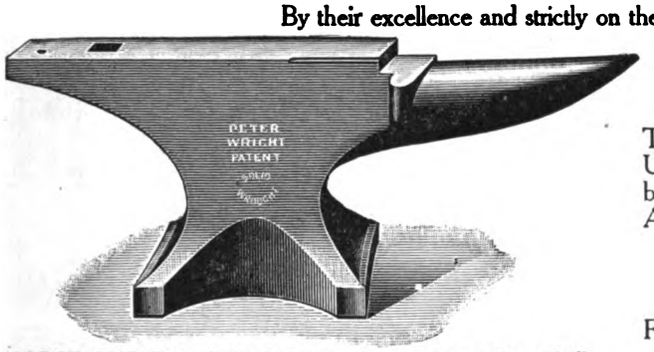
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CUSHMAN
is just the power for the blacksmith. Many improvements. Simple, durable and reasonable in price. Write for new catalog if interested. Marine or stationary
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KEROSENE ENGINES
GAS AND OIL, 1½ to 70 H. P.
Safe, Reliable, Economical.
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By their excellence and strictly on their merits maintain their position as



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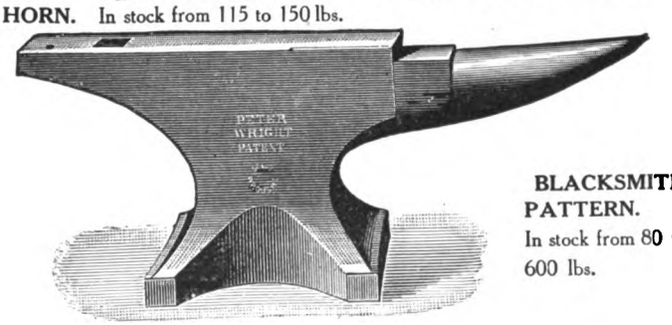
The steady increase in the demand from every part of the United States shows the growth of their popularity as never before. The makers have faith enough in **Peter Wright** Anvils to cover them with a **Full Guarantee.**

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HORSE SHOER'S CLIP HORN. In stock from 115 to 150 lbs.

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In stock from 80 to 600 lbs.

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PETER WRIGHT'S
SOLID WROUGHT
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Made of Best Scrap Iron
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Be sure the anvil you buy has our Trade Mark and Label. These are an assurance of the best that experience, proper materials and brains can produce.

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Our Aprons are made of cow Hide, purely bark tanned, soft, pliable, strong and durable. You will appreciate their superior quality and extreme comfort.



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If he cannot supply you, send your order direct to us. Upon receipt of price we will ship a perfect "Boss" Apron to you, charges prepaid, or will send same by Express, C. O. D., giving you privilege of examining it at the Express Office. If it does not suit you, send it back at our expense.

The "Boss" Aprons come complete either with or without bib. They have brass eyelets and leather straps, and every possible convenience.

PRICES.

"THE BOSS."		"THE BOSS" with Bib.	
Size X, 30x36 in.,	$1.75		
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Write to us today and we will send you a miniature Apron, showing the material used and how they are made.

EDMUND C. BECKMAN,

SOLE MANUFACTURER,

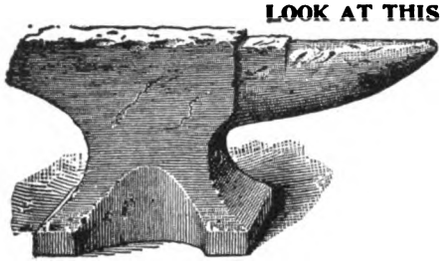
712 N. Fourth St., ST. LOUIS, MO.

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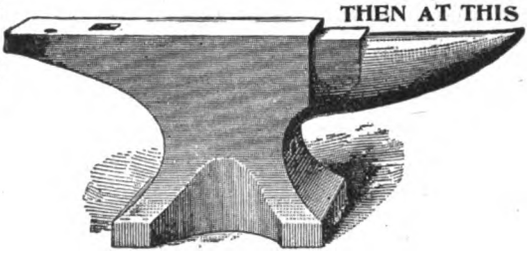
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WE CAN REPAIR THEM IN GOOD SHAPE

WE ARE EXPERTS AT REPAIRING
OLD WROUGHT ANVILS

LOOK AT THIS



THEN AT THIS



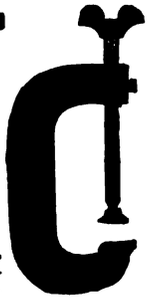
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"ARM AND HAMMER" BRAND ANVILS
Ask Your Dealer for Them



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Use BUSY tools for Busy People.

A clamp that adjusts while you would turn the screw once of the ordinary stay in the rut clamp.

A ***RACHET*** wrench that removes and replaces tire bolt nuts quick as a wink.

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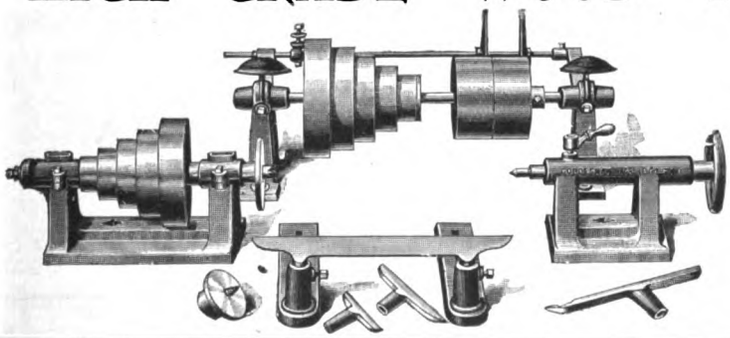


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HIGH GRADE WOOD TURNING LATHES



Uncle Sam buys Cordesman-Rechtin Wood Lathes—because they are convenient, substantial and durable machines capable of the hardest kind of turning at high speed. Because they prove a credit to his shops and are just as Cordesman-Rechtin represent them. Therefore, why should you not follow his good example?

If you are in need of a good Lathe or anything else in the wood working machine line we have some interesting information for you.

THE CORDESMAN-RECHTIN CO.,
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Successful Shoeing of Lame Horses,
write to the
HUMANE HORSE SHOE CO.
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the Manufacturers of the Humane Cushion - Heel SHOES.

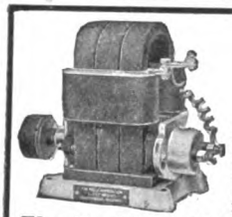


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They Never Fail to Please
BUCKEYE PAINT & VARNISH CO.
TOLEDO, O.

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IGNITING DYNAMOS
Excel all others!
The only generator that cannot lose its magnetism. For either make and break or jump spark work. Also spark coils. Send for Catalogue B.
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BARRETT'S
Pure Paint Products
Specially adapted to Carriage work. We make the "one thing best suited to your purpose." We want to send out ten thousand samples during 1907.

A sample will make you a Customer.

Goes furthest. Stands Best. Costs least.
It costs you nothing to investigate and it pays.

Write us your requirements. We will tell you something that will interest you.
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DAYTON, OHIO.
Manufacturers **Dayton, O.**

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To Find Address of any Firm given here, consult their advertisement. For its location in this issue, see Index on Page 35.

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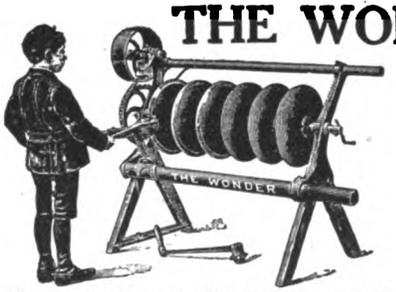
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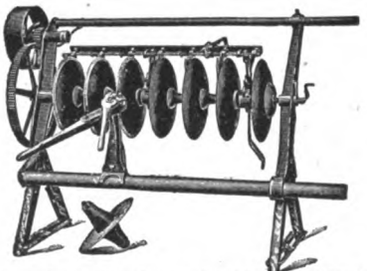
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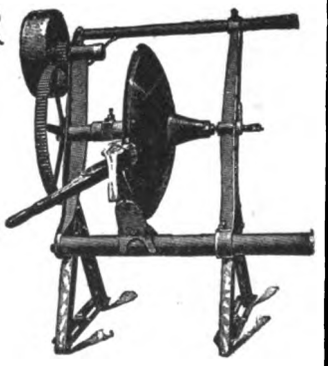
THE WONDER DISC SHARPENER



The above cut shows the LITTLE GIANT at work on a whole section of Discs. This machine is especially adapted for sharpening Disc Harrows.



The above cut shows the GIANT WONDER at work on a Seven Disc section.



The above cut shows the Giant Wonder at work on Disc Plows. Will sharpen any size from twelve to thirty-two inches in diamater.

January 1st, 1907, finds the Wonder Disc Sharpener at work in twenty-four States, Canada and Mexico.

The only Sharpener made adjustable to all conditions. Can shear any part of edge to any bevel. Can shear back from edge as far as necessary. Can use tool on either side of disc. Can shift from one disc to another. Can do all this without the turn of a set screw or nut, is a positive feed, automatically adjusts itself to wobbling or bent discs. Knives made of best grade of self tempering tool steel, will last a life time.

WISCONSIN—Dear Sir: I received your Wonder Disc Sharpener and have given it a thorough trial. Am more than pleased with it. I find that it not only sharpens, but makes the edge true and uniform like new. It is well-named, The Wonder.
Yours truly, I. G. STONE, Milton Junction.

KANSAS—A. E. Durner: This is to certify that I have been using the Giant Wonder Disc Sharpener for some time, and that I find it to be a Wonder sure. As I have used most all makes of sharpeners including the roller sharpeners, and I find to my own satisfaction that the Giant Wonder leads them all for quick and uniform work. I would not take four times the cost and be without the Wonder Disc Sharpener. Success to the Wonder.
Yours respectfully, E. B. NYE, Oketo.

IOWA—A. E. Durner: I bought one of your Wonder Disc Sharpeners last spring, and can truly say that it is the best machine I have ever used for sharpening discs. Yours truly.
JOHN T. CHANDLER, Low Moor.

SOUTH DAKOTA—A. E. Durner: I bought one of your Wonder Disc Sharpeners and found it O. K. and would advise any blacksmith in need of a Disc Sharpener by all means buy the Wonder as they will surely be satisfied.
Yours truly, J. W. IMPECOVEN, Kidder, S, Dak.

TEXAS—Dear Sir: I wish to say that the Wonder Disc Sharpener I bought this spring is O. K. It works well and is well worth the price. I am well pleased with it. Resp'y. A. F. BALL.

MISSOURI—Mr. Durner: I have one of your Wonder Disc Sharpeners. I think that it is what it is represented to be. I use my sharpener by hand power and it has proven, so far, to be the best I have ever used and am well pleased with it. Respectfully,
FRED WALKER, Duncansbridge.

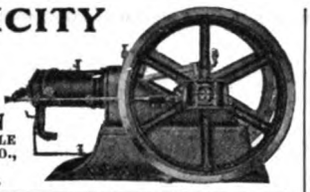
MISSISSIPPI—A. E. Durner: We wish to say that the Little Wonder Disc Sharpener we bought of Adams Neubert of Okolona, is all right and giving good satisfaction. We are well pleased with it. Respectfully,
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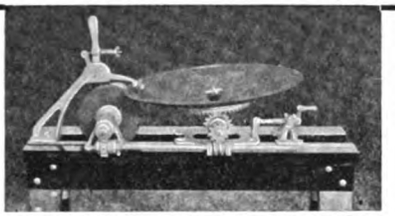
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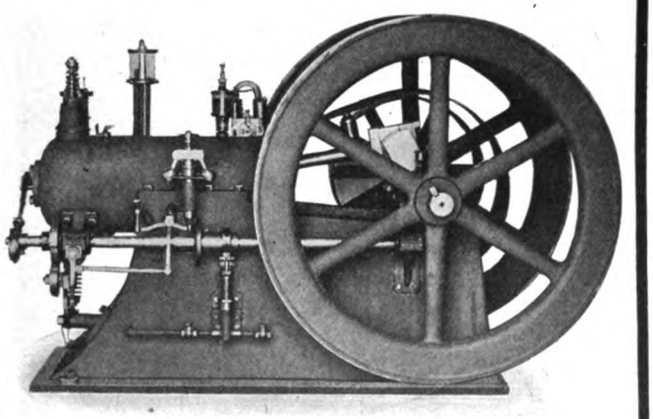


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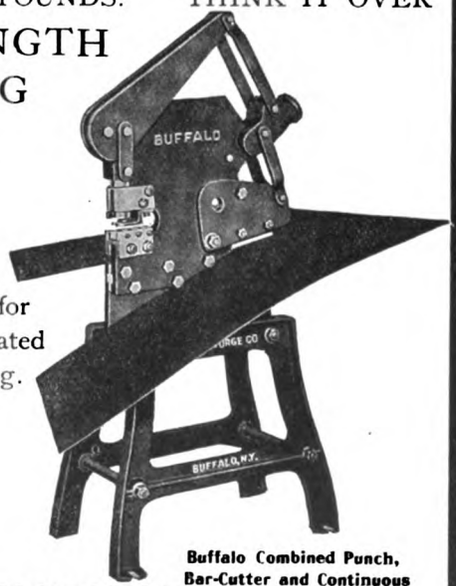
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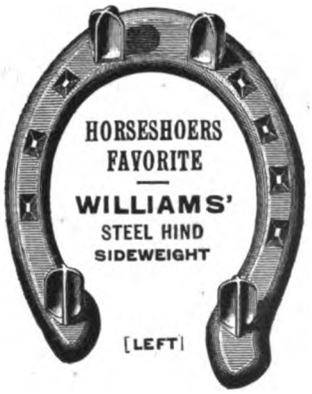
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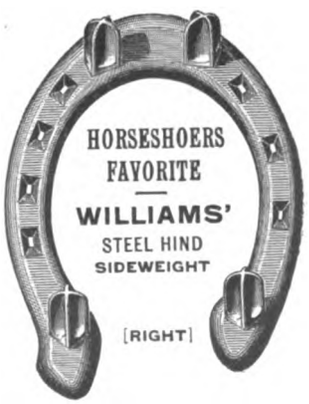
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To the Blacksmith;

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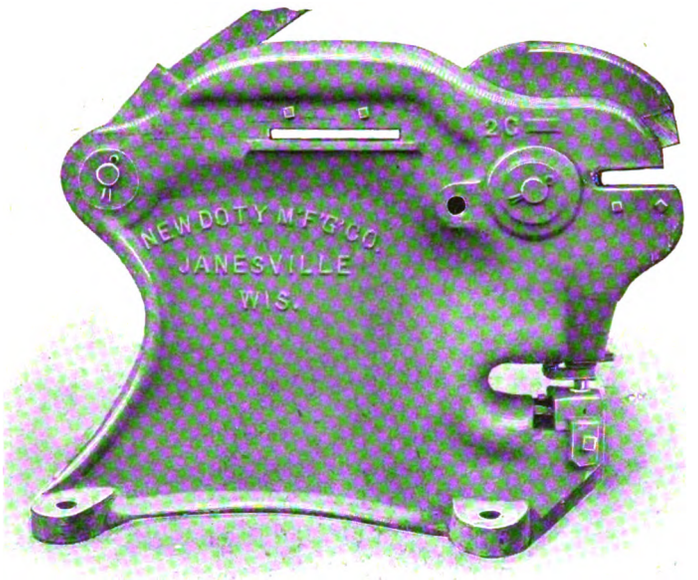
We can fill promptly from our stock all orders for A and D styles of Calks. It will go without the saying that we regret more than anybody else possibly can do the unfortunate strike against which the Williams Drop Forging Company had not prepared and protected themselves, and which so effectually tied all matters up. This, however, is a thing of the past, and it only remains for us to thank you for your kindly interest, your patience and forbearance, and assure you of our pleasure in the belief that we can now fill your orders as they are received.

Yours very truly,

BITTENBENDER & CO.

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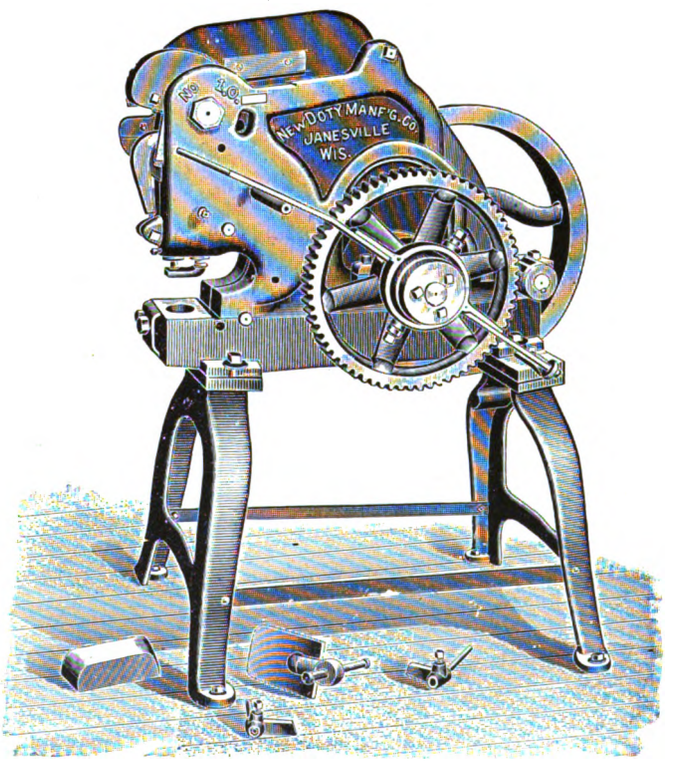


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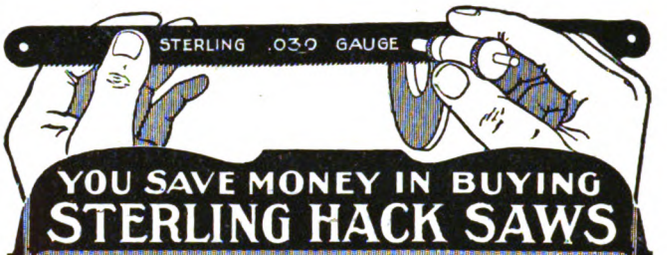
We invite you to give our Compound a thorough test, and will ship any amount to any address for that purpose. If it does not prove just as represented we pay all expenses.



Perfection Welding Compound will do the trick quickly and neatly. It makes a stronger weld than any other compound manufactured, as proven by the tests it has undergone. Send for free sample.

PRICE CONSISTENT WITH QUALITY.

PERFECTION WELDING COMPOUND CO., SCRANTON, PA.



YOU SAVE MONEY IN BUYING

STERLING HACK SAWS

HACK SAWS 10 AND 12 INCH LONG ARE 030 GAUGE THICK, TOUGHER-MORE SERVICEABLE-LASTS LONGER THAN LIGHTER THINNER BLADES.

A LOW PRICE BRITTLE BLADE HAS NOT THE

STERLING QUALITY

IF IT'S "STERLING" "IT'S ALL RIGHT"

DIAMOND SAW & STAMPING WORKS, BUFFALO, N.Y. U.S.A.

WAYNE, N. Y, Nov. 23, 1906.

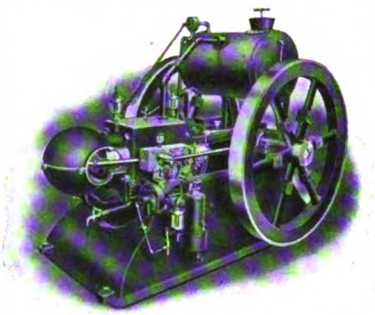
BUFFALO FORGE CO.,
Buffalo, N. Y.

Gentlemen:

I have got one of your No. 200 blowers that I ordered right away after I received your circular and I like it ever so much. Wouldn't take anything for it I couldn't get another.

Very truly yours,
A. F. SUMMER.

LIGHTNING GASOLINE ENGINES



Steam Cooled
Double Piston
No Foundation

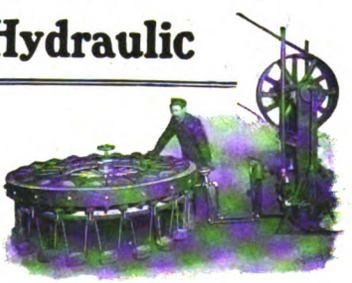
Send for Catalogue Showing Superior Points, and get Prices

KANSAS CITY HAY PRESS CO. 482 Mill St., Kansas City, Mo.

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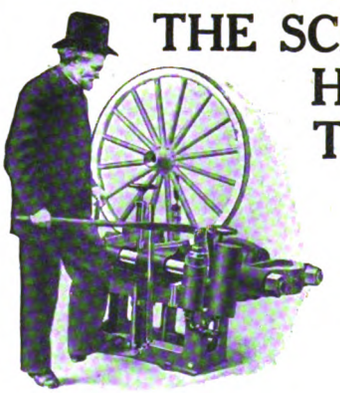
Hercules Hydraulic

Before You Buy a Tire Setter



National Machine Co.

KEOKUK, IA.



THE SCIENTIFIC HYDRAULIC TIRE SETTER

IS WHAT YOU WANT.

WRITE TO

STANDARD TIRE SETTER CO.,
KEOKUK, IOWA.

HAY-BUDDEN SOLID WROUGHT ANVILS

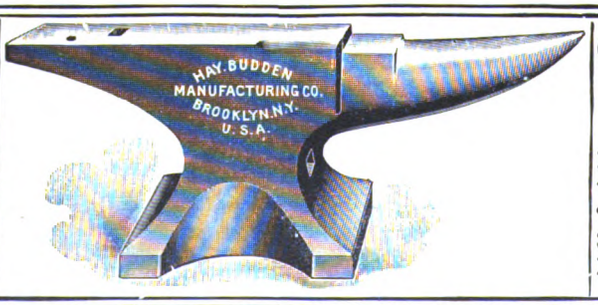
The Gold Medal Anvil

Highest Award

OMAHA, 1898 PAN-AMERICAN, 1901

Every Genuine "Hay-Budden" Anvil is made of the best *American Wrought Iron* and faced with best *Crucible Cast Steel.* Every genuine "Hay-Budden" Anvil is made by the latest improved methods.

WEIGHTS FROM 10 TO 800 LBS.



OVER 100,000 IN USE

WARRANTED

Experience has proved their worth and demonstrated that "HAY-BUDDEN" Anvils are Superior in Quality, Form and Finish to any on the Market.

HAY-BUDDEN MFG. CO., BROOKLYN, N. Y.

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VOLUME 6 NUMBER 5

THE AMERICAN BLACKSMITH

A Practical Journal of Blacksmithing and Wagonmaking

BUFFALO
N.Y. U.S.A.

FEBRUARY, 1907

$1.00 A YEAR
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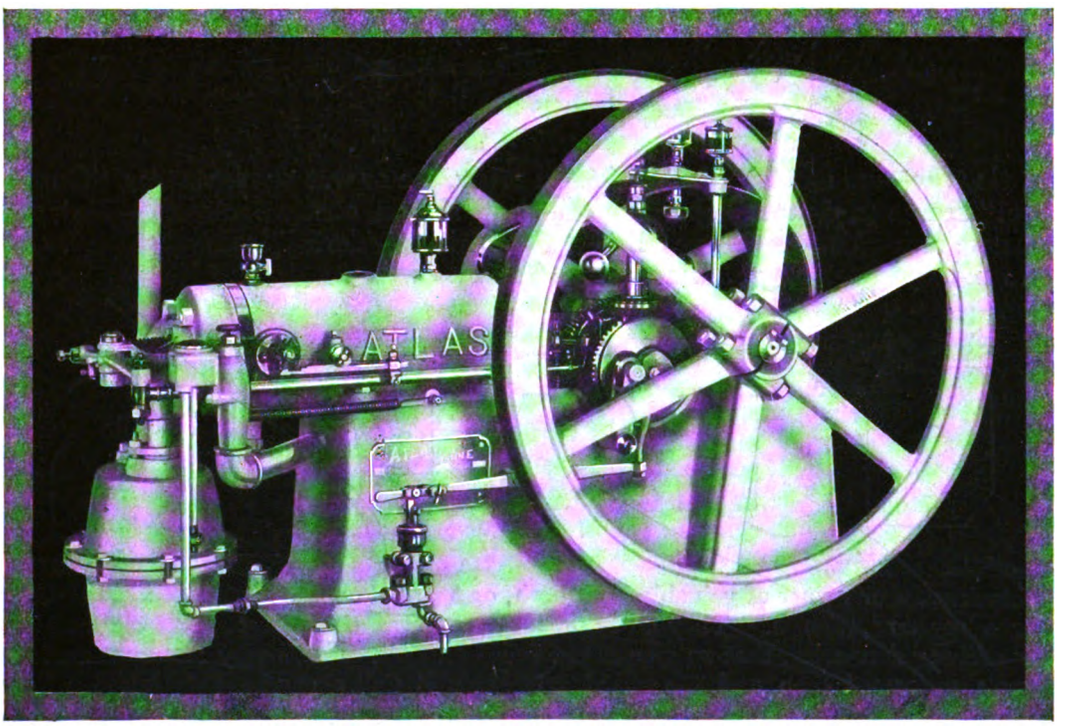
ATLAS

GAS AND GASOLINE ENGINES

START WITHOUT CRANKING

An ATLAS ENGINE will start on compression also. Just swing the flywheel one quarter turn forward and then back against the compression, when the automatic igniter will trip and the engine will start immediately. This reliable starting is accomplished with one simple cam which automatically controls the taking of a fresh charge, the proper igniting of same and the exhaust.

THE ATLAS IS THE HIGHEST GRADE ENGINE BUILT.



ATLAS ATLAS

Complete Descriptive Bulletin Free. Mention The American Blacksmith.

RELIABLE AGENTS WANTED. A HIGH GRADE PROPOSITION.

ATLAS ENGINE WORKS

INDIANAPOLIS, INDIANA

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Over the dangerous places

A Guardian Angel protects

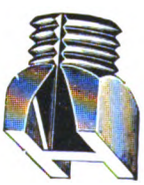


Yes, tis true—no matter whether it's on snow, ice or wet pavements, a "Guardian Angel" seems to protect some horses—but if you observe closely—look at the fortunate animal's feet——you'll find that this wonderful *practical protection* is all *due* to the *self-sharpening* calking device known as



GENUINE

H-CALKS



When New **When Half Worn**

To the blacksmith or owner of valuable horseflesh, or to the horse wearing genuine H-Calks, this is never a mystery, though. They all know it's most *simple*, yet *most sure* and gratifying—this *superior calking invention*, that so guards the lives of horses. That's why H.-Calks are known as the horse's *universal* limb and life guard. Genuine H-Calks can be substituted, where other *poor*, *dulling* and *pointed* calks have proven failures—having the same size thread. They can't become dull—as they are *self-sharpening*. Genuine H-Calks keep their *original* H-shape—their six sharp-cutting edges are constantly giving service and *ability* to the horse to travel *safely*, the moment these H-Calks are inserted—until worn to the thread in the shoe. You'll *never* see an H-Calk horse down in the shafts—from slipping.

Blacksmith's who endorse genuine H-Calks are doing a *charming* and profitable business—horses wearing genuine H-Calks are experiencing seemingly *charmed* lives. We sell only to blacksmiths and horseshoers.

Ask your blacksmith for the self-sharpening kind--this means long wearing processed steel--genuine H-Calks. We guarantee these calks to *outwear* any other calks made. Send for H-Calk booklet. It's interesting.

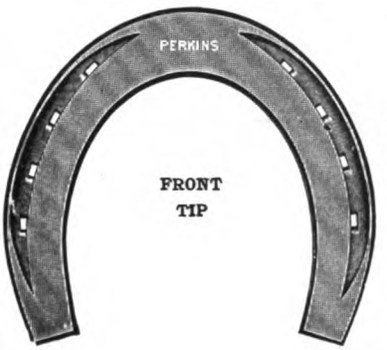
H-CALK CO., (Inc.), 16 Beaver St., NEW YORK.

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HIND
LONG HEEL.

Look for this Trade Mark ★ The Star brand beats all others



FRONT
TIP



FRONT
LIGHT.



FRONT
TOE WEIGHT.

★PERKINS★
HORSE SHOES
AND
TOE CALKS
The **SUPERIOR** Kind

Have more points of superiority than any other make. An up-to-date shoe for up-to-date Blacksmiths.



HIND
SIDE WEIGHT.

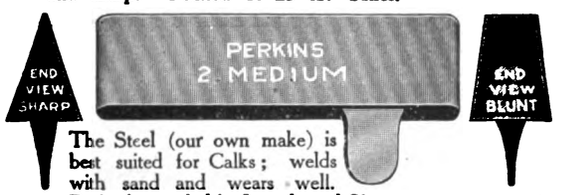
Perkins Shoes have given satisfaction wherever used. Our line is complete and every shoe guaranteed. Made in all styles and sizes. Send for sample. New Pattern Front Extra Light and Light. Free for the asking. We will gladly send

COMPLETE CATALOGUE AND SAMPLES FREE.

WRITE TODAY.

PERKINS

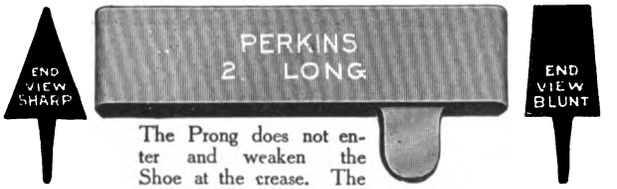
Made in Medium and Long, both blunt and sharp. Packed in 25 lb. boxes.



The Steel (our own make) is best suited for Calks; welds with sand and wears well. Perfectly graded in Length and Size.

TOE CALKS

Chisel Pointed Prong. These cuts show exact size of No. 2. SAMPLES SENT FREE.



The Prong does not enter and weaken the Shoe at the crease. The only slightly curved Calk sold.

MANUFACTURED BY

RHODE ISLAND PERKINS HORSE SHOE COMPANY

PROVIDENCE, RHODE ISLAND.

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Have You Graduated?

IF you knew all about the many labor-saving tools that could be used in your shop, you could easily decide whether it would pay you to use any of them.

¶ Are you willing to graduate and be among those who "know"?

¶ You get more than pleasure and easy work from the use of good, modern tools—you get good profits in cold cash.

¶ If you 're interested in the best,

SEND FOR BOOKLET,

"Carriage Maker and Blacksmith Tools,"

and find out the money-making possibilities in our modern improved machines. We haven't been mixing expert brains with the best materials all these years for nothing.

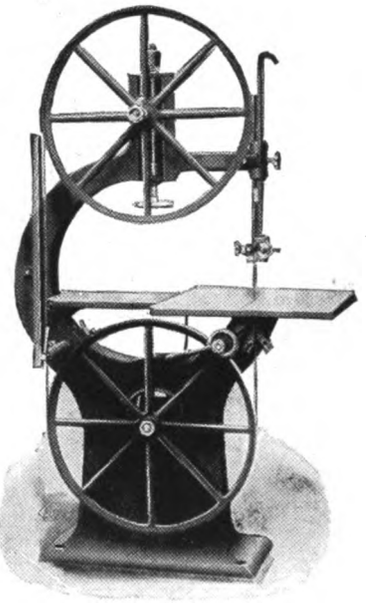
Sllver Manfg. Co.

365 Broadway,

Salem, Ohio, U. S. A.

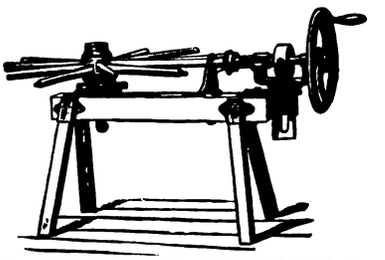
Improved Band Saws

Foot and belt power. New patterns throughout—rigid, symmetrical construction, new table tilting device, perfectly balanced wheels. Belt shifter, adjustment of upper wheel, saw guide, tension of saw blade, etc., all within easy reach of the operator. Sizes, 20 to 36 inches.



Spoke Tenon Machine

Dole and Deming's patent for hand and power; cuts tenons on spokes and does it perfectly. Its absolute accuracy adapts it to highest grade work.



Portable Forges

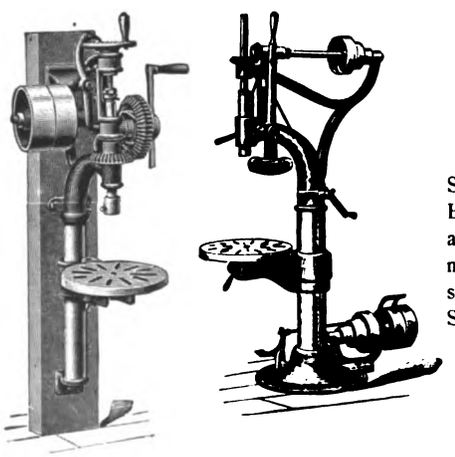
We make 14 kinds of Portable Forges. We have a size to suit your needs. Strong and durable. Attractive designs.



Fig. 901, with Shield.

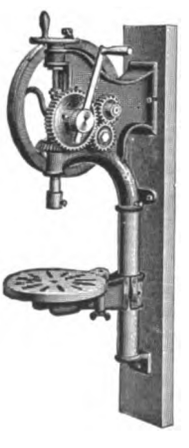


Fig. 925.



Drills

Swing, Post and Bench Drills for hand and power. Automatic feeding, new simple and efficient. Strong and durable.



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Buffalo 200 Blower

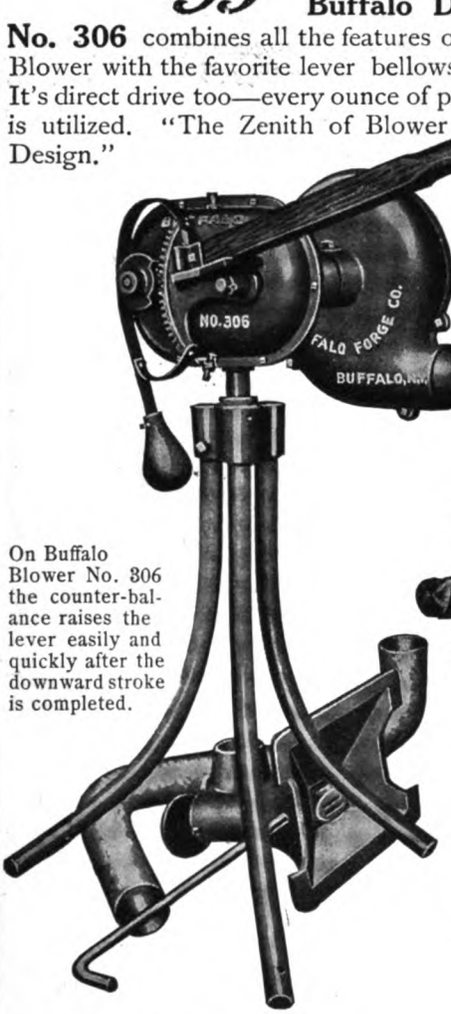
Buffalo Direct Drive Blower

No. 306 combines all the features of Buffalo No. 200 Blower with the favorite lever bellows motion. It's direct drive too—every ounce of power is utilized. "The Zenith of Blower Design."

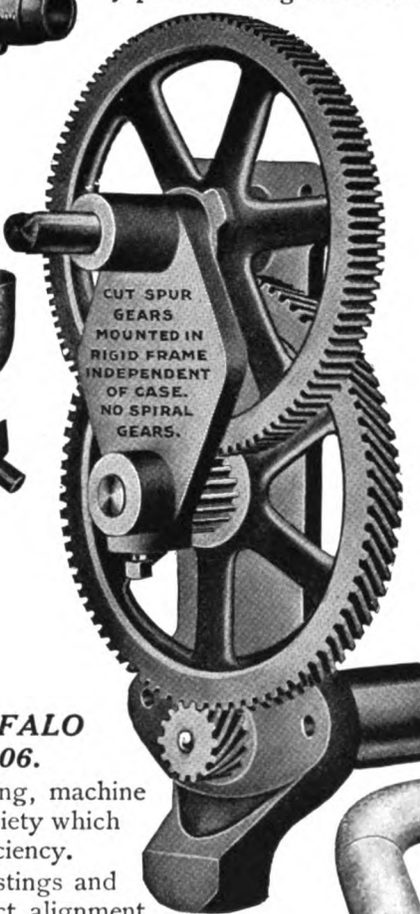
GUARANTEED FOR FIVE YEARS

GUARANTEED FOR FIVE YEARS

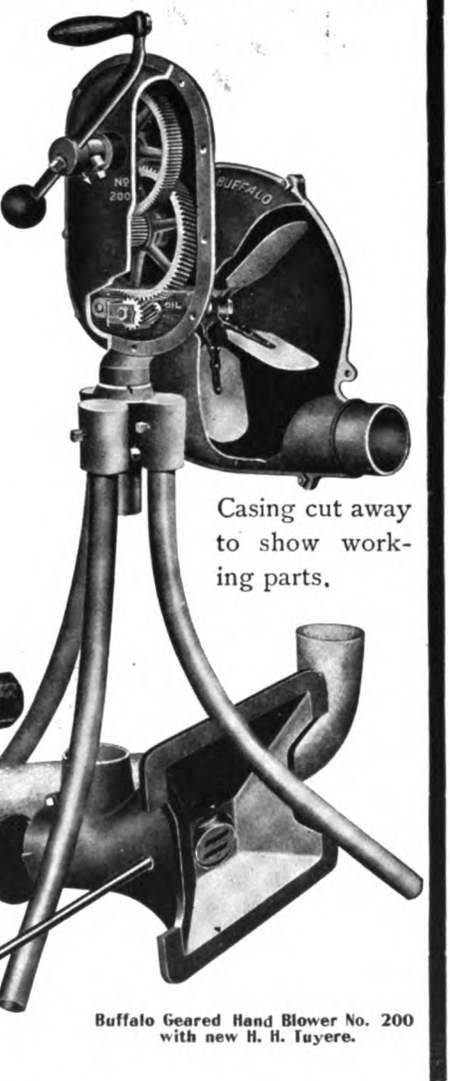
Buffalo Nos. 200 and 306 Geared Hand Blowers are guaranteed to outwear any others on the market and to produce a stronger blast with less effort than any other blower built. Any parts wearing out in five years will be replaced free of charge.



On Buffalo Blower No. 306 the counter-balance raises the lever easily and quickly after the downward stroke is completed.



Gearing used on Buffalo Blowers Nos. 200 and 306.



Casing cut away to show working parts.

Buffalo Direct Drive Blower No. 306 with new H. H. Tuyere.

Buffalo Geared Hand Blower No. 200 with new H. H. Tuyere.

TELLING POINTS OF BUFFALO BLOWERS NOS. 200 and 306.

Gears—Heavy, with large, strong, machine cut teeth, cut spur and helical variety which reduces friction and increases efficiency.

Bearings—Bored from solid castings and reamed to gauge, ensuring perfect alignment and easy, silent running.

Oiling—Gears constantly run in oil, keeping the working parts perfectly lubricated.

New Illustrated Folder sent on request.

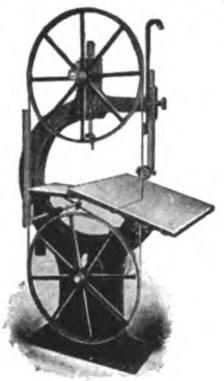
Sold by Best Dealers Throughout Entire World.

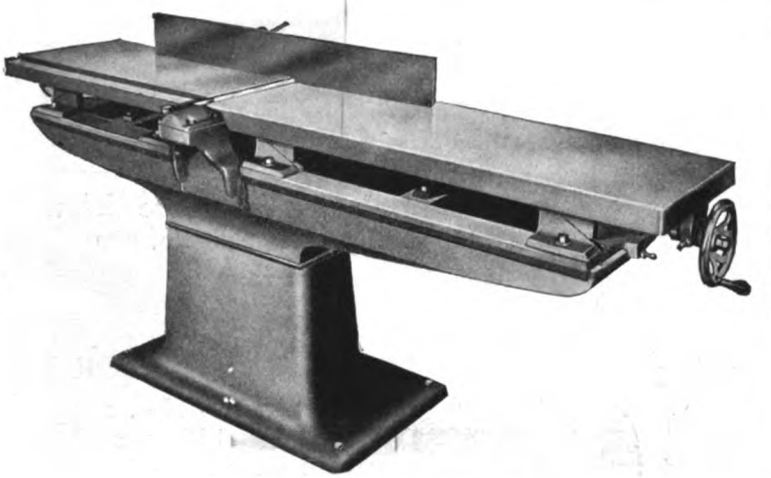
Buffalo Forge Company
Buffalo, N.Y.

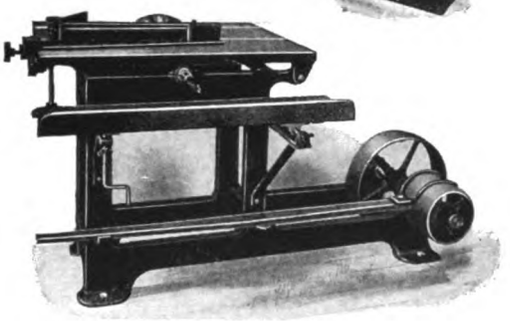
Canadian Friends Buy of The Canadian Buffalo Forge Co., Ltd., Montreal, and Save Duty.

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Band Saws
Cut off Saws
Swing Saws
Rip Saws
Jointers
Lathes







TAKE NOTICE.

If you are in the market for high grade wood working machinery, at very moderate prices, and designed especially to meet the requirements of blacksmiths and wagon makers, write us for our 1907 catalogue.

The Sidney Tool Co., Sidney, O.

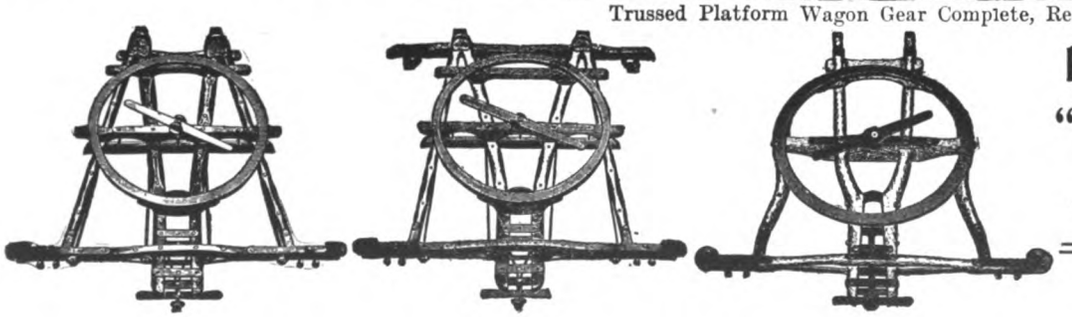
Complete GEARS

As shown herewith, ready to receive body, for light and heavy work, can be furnished promptly.
In ordering, give full specifications, or such descriptions as will enable us to make up specifications.

Also Combination and Three-Spring Gears in several styles.



Trussed Platform Wagon Gear Complete, Ready for Body.



1,000 Styles and Sizes

"Selle Gears"

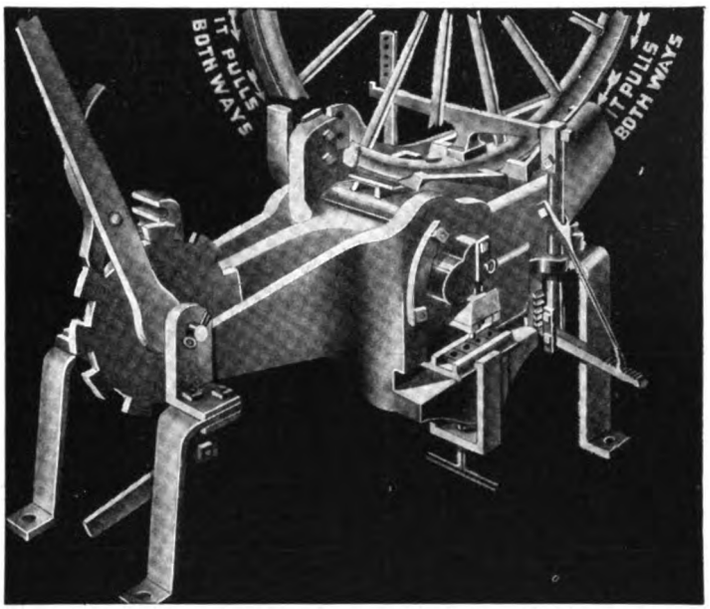
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THE AKRON-SELLE GEAR CO.

Akron, Ohio, U. S. A.

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THE HOUSE COLD TIRE SETTER



This is a Cut of Our No. 1 Machine, which sets all size tires up to 2 by ¾ inches and shears ⅝ by 3 flat iron and ⅞ round, and punches holes up to ½ inch, and does it almost as fast as you can count. Can be changed from one size hole to the other in two seconds.

UNCLE SAM HAS ADOPTED IT. If the government cannot do without a Cold Tire Setter, how can you? They tried others and did not stop until they found the best. Why don't you take advantage of their experience and save yourself trouble? Or, why would you do without, for it does set a tire cold in five minutes and does it better than it can be done in the old way in sixty minutes. Why not get out of the rut and buy one? There are thousands of them in use now and hundreds of them are clearing their owners from one to two thousand dollars annually. They cannot be broken. They never get out of fix. The first one we ever made is in use today, and we have 700 others along with it working now in our own native state. We have them in all the states of the Union, besides nine different foreign countries. Don't be deceived into buying an experimental machine because it is advertised big, when you have a chance to get a demonstrated success, especially when we sell ours for as little or less money and make you a present of an $80.00 punch and shear.

Our No. 3 machine has both hand and power attachment. Sets all ordinary tires up to 1 by 4½ inches, and shears 1¼ by 5 flat, 1¾ round. Also cuts all axles up to 1½ square, and will punch any size up to ¾ holes. Adjustment same as No. 1.

HOUSE COLD TIRE SETTER CO.

OFFICE AND FACTORY
216-220 So. Third St., ST. LOUIS, MO., U. S. A.
No. 40 Church St., Toronto, Ont., Can.

HE IS A WISE SHOER

WHO MAKES A SPECIALTY OF THE PAD END OF HIS BUSINESS

There is plenty of reason for believing that as soon as teaming concerns, express companies, liveries, and like users of horses become fully aware of the value of pads in giving increased service per horse, in avoiding lay-ups due to hoof troubles, and in reducing veterinary bills, 99 per cent of them will become pad enthusiasts.

And the shoer who is a "pad specialist" will add a nice monthly sum to his bank account.

BUT (and this is mightily important) he is not a Wise Shoer who attempts business suicide (by the use of poor pads) just as this big, profitable business is knocking at his front door.

In other words, there is not much money in being an expert at putting on unsatisfactory pads.

MORGAN & WRIGHT pads have gained the reputation among shoers of being "pads that help the pad business."

Shoers who begin using them almost invariably find it to their advantage to use them exclusively.

Such shoers are laying their foundation lor a big pad business by giving their customers pads that encourage pad using.

They are "cinching" future business by the use of MORGAN & WRIGHT pads.

Be a wise shoer.

Be a good pad specialist.

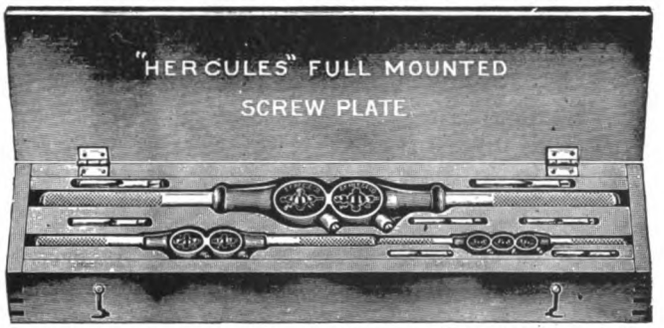
MORGAN & WRIGHT PADS ARE GOOD PADS

A pad for every purpose—15 in all. Easy to fit. Run larger than other brands. Any jobber can supply you.

MORGAN & WRIGHT, - DETROIT

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INVESTIGATE BEFORE YOU BUY



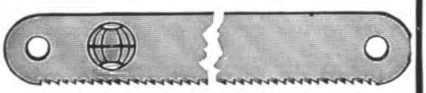
Be sure you are getting value received. Skilled mechanics know that **Reece Improved** and **Hercules Full Mounted Screw Plates** are the freest and most accurate cutting tools made, finest in quality, yet lowest in price.

Have you a copy of our illustrated catalog and price list? If not, write today. Free for the asking.

THE E. F. REECE CO., GREENFIELD, MASS.

Your Hack Saw Troubles

will come to an end if you get the old reliable Universal brand. Send for our free booklet with hints on the use of the hack saw.



West Haven Manufacturing Co.
NEW HAVEN, CONN.

NATIONAL SELF-OILING STEEL TUBULAR AXLES

Now made of high carbon steel.



Guaranteed to be stronger and more rigid than solid steel axles. We make both. Write us

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Electric Forge Blowers Excel All Others

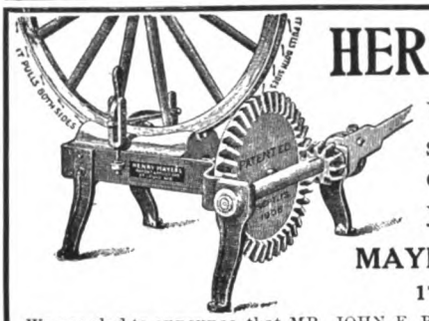
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A Good Blower That Blows Everybody Good.



MODERN MACHINERY MAKES THE SMITH'S WORK LIGHTER

ROTH BROS. & CO.
27-29 So. Clinton Street,
CHICAGO, ILL.



HERE IS OUR FAITH!

We want you to TEST, Try—satisfy YOURSELF that OUR MACHINE is what you want, before you assume ANY OBLIGATION.

MAYERS TIRE SETTER M'F'G CO.
1721-23 N. 8th St., ST. LOUIS, MO.

We are glad to announce that MR. JOHN F. BADGER, one of the most widely known and successful salesmen in this line, has secured an interest in and become an officer of this company and would appreciate hearing from his friends.



COATES ELECTRIC CLIPPER

Clip your horse and sharpen his toe calks with the same machine. Move the light clipper around, no need to move the horse. You should know all about **Coates Flexible Shaft Machine.**

Send for Book A. B.

COATES CLIPPER MANF'G CO.,
WORCESTER, MASS.

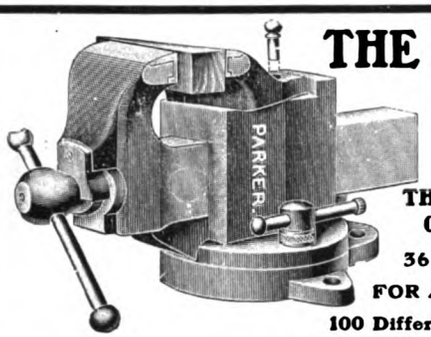
Scott's IXL ALL High Speed Steel

Will cut at least one speed faster than any other high speed steel on the market.

Write for Catalog covering entire line of SCOTT TOOL STEELS.

THE BOURNE-FULLER CO.,
Cleveland, O.

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THE PARKER VISES

THE MOST RELIABLE ON THE MARKET

36 Different Styles,

FOR ALL PURPOSES,

100 Different Sizes.

Parker vises will be found in the best equipped shops in the country. No other vise has given to the trade such general satisfaction. Our new line of improved vises has reinforced sliding jaws, making the Parker vises stronger and more durable than ever.

Made of a blending of steel and best iron in the castings.

The steel faces on these vises are milled and fitted to the jaws and are removable. Have self-adjusting back jaws which automatically adapt themselves for holding wedge-shaped pieces.

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DURABLE
HANDY



Our complete illustrated catalogue is free. Write today for price list also.

A tool of many uses. Both round and pipe jaws interchangeable. Weight, 76 lbs.

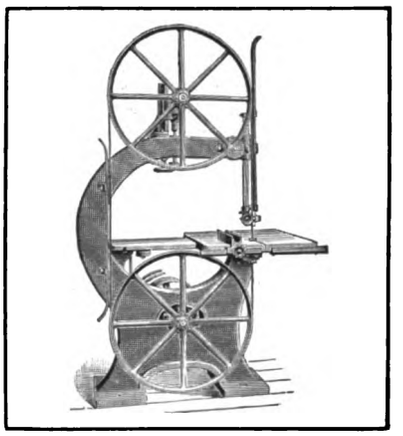
THE CHAS. PARKER CO.,

MERIDEN, CONN.

YOU NEED
Wood Working Machinery.

Wood Working Machines in your Shop will enable you to do better work and more of it than you can do with hand tools.

We Build Just the Machine You Need.



Catalog describing a fine line of moderate priced BAND SAWS, SAW TABLES and JOINTERS mailed on request.

SEND FOR IT NOW.

The Crescent Machine Co.,

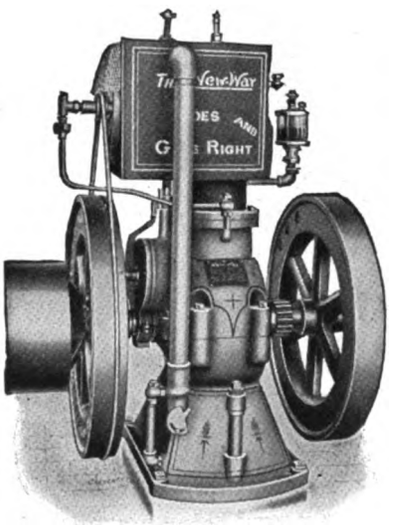
245 Main St. LEETONIA, OHIO, U. S. A.

NOTICE TO BLACKSMITHS.

THE "New-Way" AIR COOLED
Is the Only GASOLINE ENGINE

Built especially for Blacksmiths' Use.

3 to 7 H. P. Horizontal and Vertical.



Look at the other engines first. Note the multitude of rods, springs and triggers described as **simple.** Remember that the water tank (always left out of the cut) has to be filled and emptied every winter day. To forget it once may mean a ruined engine. Remember that water cooled engines all have packed cylinder heads. Packing leaks and blows out. Inevitable trouble and loss of power sometime.

THEN LOOK AT AN ENGINE THAT IS SIMPLE

THE "New-Way"

One piece cylinder—no chance to leak—grows stronger with use. Everything enclosed—no frail parts—no water—not a piece of packing or a gasket in it—no gasoline pump troubles. It absolutely cannot be overheated under full load—any temperature—any length of time. Your judgment tells you to

WRITE FOR CATALOG "K." DO IT NOW.

60 Sheridan St.

THE "New-Way" MOTOR COMPANY
LANSING, MICHIGAN, U.S.A.

60 Sheridan St.

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SOME POPULAR TOOLS

Royal Blower

"The Successful Blower"

Crank Turns Forward or Backward.

Noiseless and Easy to Operate

Gear case is oil-tight and dust-proof. Gears run in a continuous bath of oil.

Gears are Phosphor Bronze and Steel, flat and straight cut. No Spiral or Worm Gears.

Fire-pot is 8x9½x4 inches inside.

A powerful blast; lasting after blast



Fan, 12 inches. Height, 47 inches. Weight, 135 pounds.

Can be furnished to operate with the right arm, for left-handed smiths, when desired.



Royal (Western Chief) Forge No. 100

For use of Large Blacksmith, Wagon, Plow, Railroad Shops, Etc., where Heavy Work is Done, and a First-class Forge and Fire Are Needed.

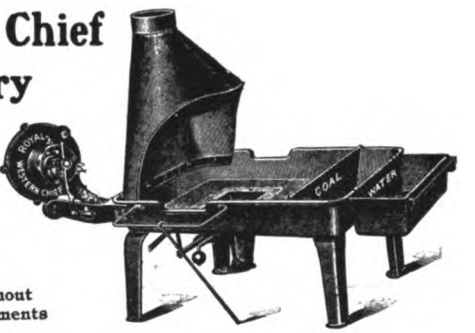
Fan, 12 Inches.
Height, 30 Inches.
Weight, 300 Pounds.
Hearth, 31½ x 48¼ Inches.
Length Over All, 53 Inches.

In this Forge we combine our "Royal" style of Blower with Western Chief Standard Hearth, having Solid Fire-pot with Tuyere Ball Furnishing side and center blast. We guarantee it fully.

Western Chief Stationary Forges

Six Different Styles

With or Without Blower Attachments





ROYAL FIRE-POT

Needs No Clay

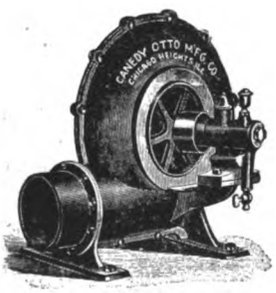
Dimensions 8 x 9½ 4 inches inside

Tuyere Iron

Write for catalogue describing our full line of

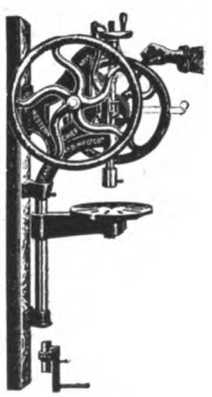
Forges, Blowers and Drills

For sale by first-class dealers all over the world.

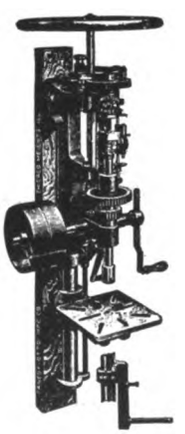


Western Chief Power Blowers

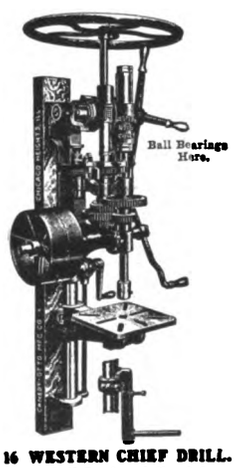
Built in sizes suitable for from one to seven fires



No. 15 WESTERN CHIEF DRILL.
Automatic Self-Feed.
19 in. Circle.



No. 14 WESTERN CHIEF DRILL.
Automatic Self-Feed, and the only AUTOMATIC Quick Return Post Drill Made. 21 in. Circle.



No. 16 WESTERN CHIEF DRILL.
Automatic Self-Feed and Hand Lever Feed. Largest Post Drill Made. 24 in. Circle.

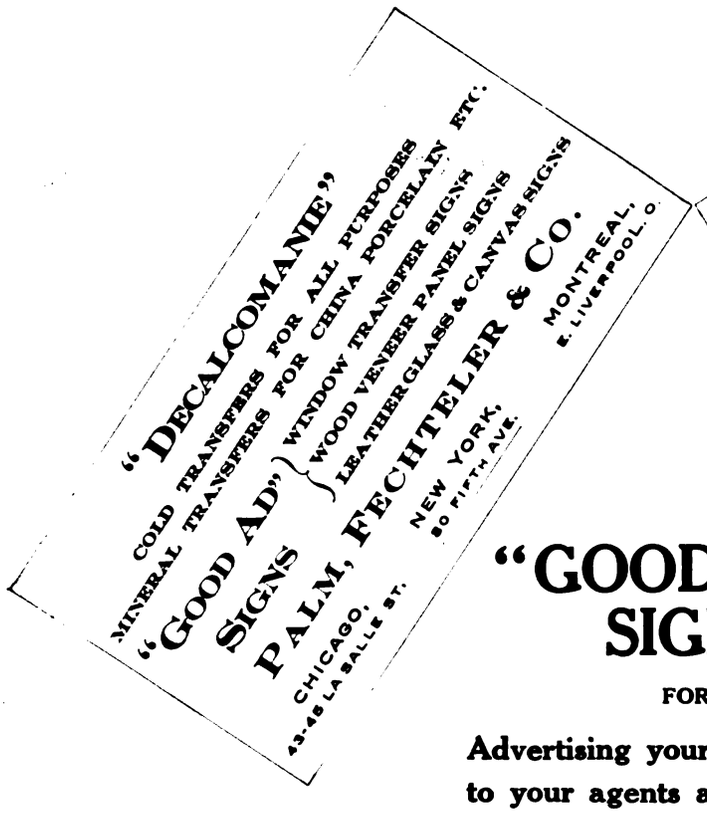


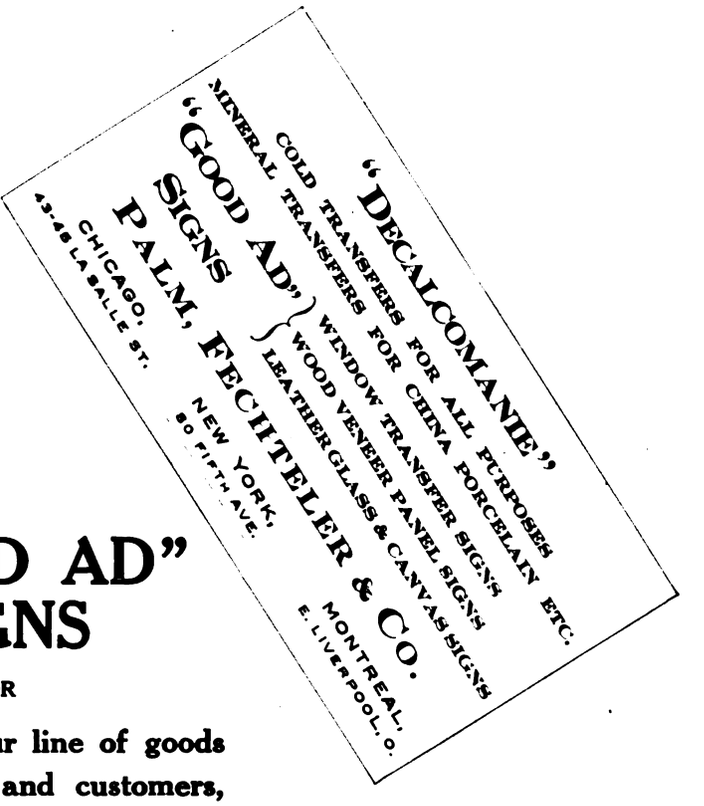
No. 17 WESTERN CHIEF DRILL.
Automatic Self-Feed and Hand Lever Feed. 24 in. Circle.

MADE BY **CANEDY-OTTO MANUFACTURING CO.**

CHICAGO HEIGHTS, ILLINOIS

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"GOOD AD" SIGNS

FOR

Advertising your line of goods to your agents and customers,

WINDOWS AND DOORS, SHOW CASES, ETC.

REGULAR TRANSFERS

FOR

Decorating, Lettering and Numbering any job you have to do.

SPECIAL DESIGNS

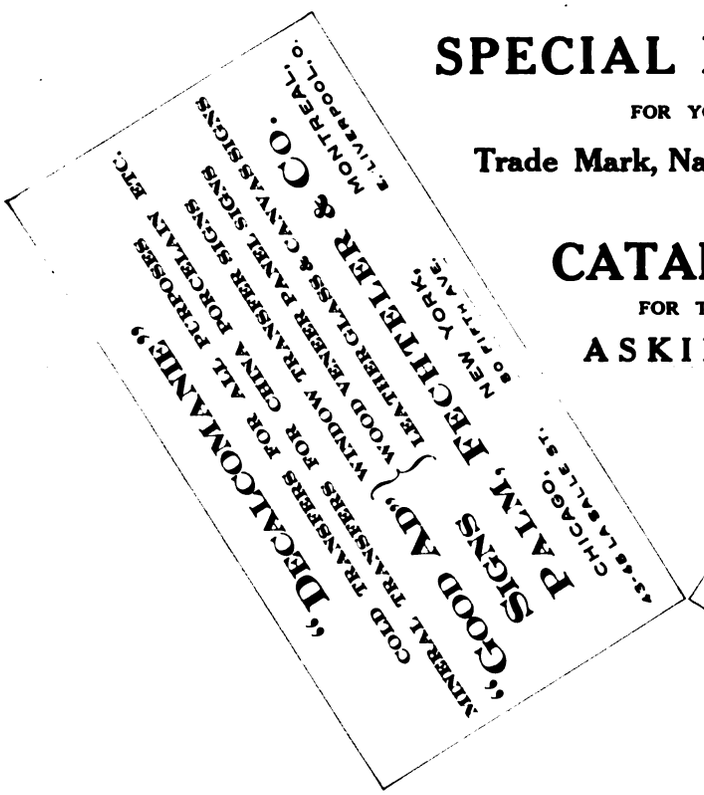
FOR YOUR

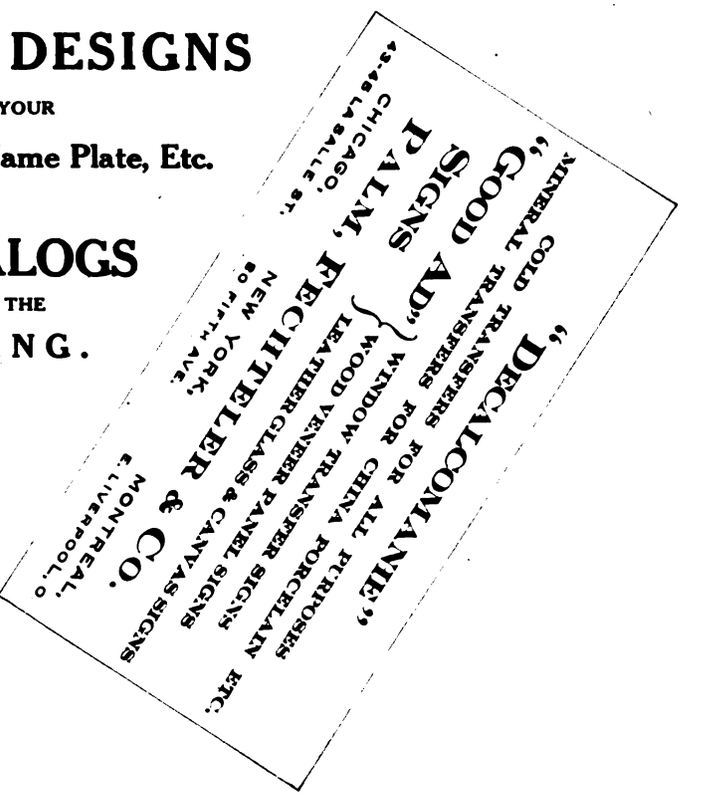
Trade Mark, Name Plate, Etc.

CATALOGS

FOR THE

ASKING.





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ECCLES BALL-BEARING COUPLINGS

With Leather Bushings in one piece, securely fastened in the socket of the Coupling.

When the shafts are removed, the bushing does not come out, but stays in the Coupling where it belongs. NO LOST BUSHINGS WHEN YOU USE OUR COUPLINGS.

We would like to send you our circular and have you try our Couplings. They will save you money.



See the Clinch?

Pat. applied for

The Spring is pivoted at the front so that it can be turned forward out of the way of the wrench while clipping the Coupling to the axle.

These are two of the good points, but there are plenty more desirable features in our Couplings.

Patented Nov. 25, 1902.

We also have a Catalog showing our full line of **Carriage and Wagon Forgings** all of which we make.

RICHARD ECCLES CO., Auburn, N. Y.

THE BEST TOOL ON EARTH

For a Horse Shoer

Price, $1.75 Each

By Express Charges Paid to any point in United States



THE IMPROVED EASY HOOF TRIMMER

DIMENSIONS.—Weight, 2 lbs., Length, 12 ins., Opens 2 ins., Cuts 1 in. **OUR GUARANTEE.**—If you don't like it you can return it and get your money. **Directions for Using.**—First—Hold the foot in the ordinary manner and remove soft parts from bottom with your toe knife; then with the trimmer begin at the heel and cut down and around the toe and back on the other side, removing the part at one cut and in one piece. Second.—Avoid all wrenching or prying. Hold the tool as near upright as you can. Cut straight through to the blank jaw regardless of nails or other obstructions, and with very little leveling with the knife or rasp your job is complete.

THIS TOOL has been rightly named because it is EASY to adjust, EASY to sharpen, and EASY to convince a horse shoer that it will cut a hoof down easier, quicker and better than any tool he ever saw.

It has a detachable knife that can be removed or replaced in a moment. The knife jaw is adjustable by means of screws. When the knife becomes shorter by sharpening, give the screw a turn or so and the reins will go back to the proper distance apart. When knife wears out it can be replaced for a few pence.

CAUTION.—Don't make the mistake that a great many do by grinding bevel on one side of blade, but keep the bevel equal on both sides, so that it will pass through the hoof straight and not in a strain.

Follow above directions and you will soon learn to use THE BEST HOOF TRIMMER ON EARTH.

MADE BY

MUNCIE WHEEL & JOBBING CO.

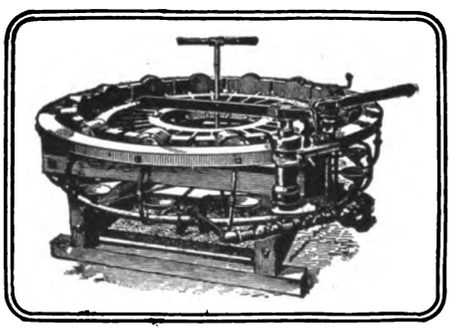
MUNCIE, IND.

Sole Wholesale Agents for British Isles:

THE IRON AND HARDWARE CO., LD.

Gloucester, England

The West Hydraulic Tire Setter



Is a **Round Machine** for tiring **Round Wheels,** and compresses the tire at all points—not all in one spot—and the compression is so slight at any particular point that tire bolts do not have to be removed when resetting an old tire, neither are holes closed so bolts are tight in tire. Wheel is made compact and joints tight.

WRITE US YOUR REQUIREMENTS.

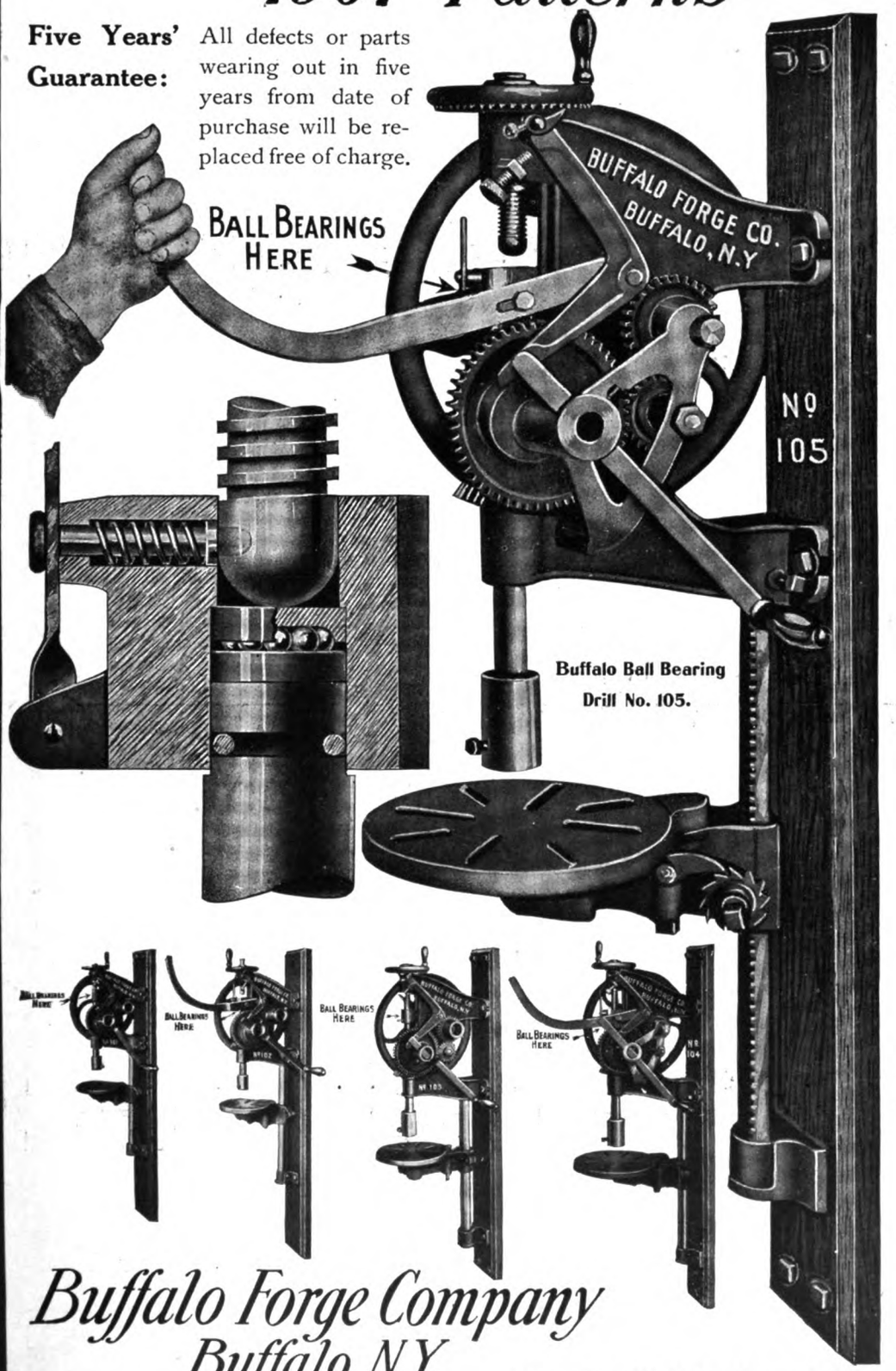
The West Tire Setter Company

ROCHESTER, N. Y.

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Buffalo Ball Bearing Drills
1907 Patterns

Five Years' Guarantee: All defects or parts wearing out in five years from date of purchase will be replaced free of charge.



Buffalo Ball Bearing Drill No. 105.

BUFFALO 1907 DRILLS.

5 Sizes
5 Capacities
5 Prices
Send for Photographs

Designs are
New
Strong
Simple
Durable
Original
Jig Made
Practical
Symmetrical
Extra Heavy

Features:
Two Speeds
Lever Feed
Quick Return
Slotted Table
Ball - Bearings where they count, on the high speed spindle, ***not*** on the slowly rotating feed mechanism.
No Lock-Nuts to take the thrust – Buffalo 1907 Drills are free from these by-gones.
Pin Clutch; Nut Closing Devices avoided.
Combination Lock - Nut, Ball - Bearing & Pin Clutch.
Bearings ***bored*** and ***reamed*** in solid metal, no liners used.

Buffalo Forge Company
Buffalo, N.Y.

Canadian Buffalo Forge Co., Montreal, Canada.

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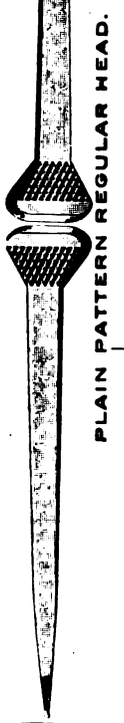
THE EASIEST NAILS TO DRIVE AND THE MOST ECONOMICAL

"CAPEWELL" NAILS RUN MORE TO THE POUND THAN ANY OTHER NAIL.

The vast majority of horseshoers in this country—after testing thoroughly and proving the SUPERIOR QUALITIES and the ECONOMY of "THE CAPEWELL" nail—always insist upon having this brand.

So popular have these nails become that more than half of the nails sold in the United States each year are "Capewell."

You Will Always Find it in Your Interest to Specify for "The Capewell."





Made by **The Capewell Horse Nail Company**

HARTFORD, CONN.

The Largest Manufacturers of Horse Shoe Nails in the World.

BRANCHES

New York: . .	103 Beekman St.	Chicago: . .	238-240 Randolph St.
Philadelphia: . . .	323 Arch St.	St. Louis: . . .	12-14 North 12th St.
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Buffalo:	11 Ellicott St.	Denver:	1611 Blake St.
Cincinnati:	720 Main St.	San Francisco :	Santa Fe Warehouse, Spear St.
Detroit:	29-31 Farrar St.	Portland: .	554 Worcester BlocK.
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Catalogue and 1907 Calendar Free upon Application.



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DON'T BUY GASOLINE ENGINES

UNTIL YOU INVESTIGATE "THE MASTER WORKMAN," a two-cylinder gasoline, kerosene or alcohol engine, superior to any one-cylinder engine; revolutionizing power. Its weight and bulk are half that of single cylinder engines, with greater durability. Costs Less to Buy—Less to Run. Quickly, easily started. Vibration practically overcome. Cheaply mounted on any wagon. It is a combination portable, stationary or traction engine. SEND FOR CATALOGUE. THE TEMPLE PUMP CO., Mfrs., Meagher and 15th Sts., Chicago. THIS IS OUR FIFTY-THIRD YEAR.

Cutaway Tools for Large Hay Crops.

Three of **Clark's Intense Cultivators** produced this year on 14½ acres 102, tons of well dried Alfalfa Timothy & Red Top hay. If you want to know how

CLARK'S DOUBLE ACTION JOINTED POLE CUTAWAY HARROW



No More Use For PLOW

Send for Circulars to the CUTAWAY HARROW CO., Higganum, Conn., U.S.A.

THROW OUT THAT BATTERY

THE Apple Automatic Sparker

that causes so much trouble on your gas engine, and install an **Apple Automatic Sparker.** No switches, no belts, no batteries for starting or running. A dynamo that produces a strong, steady current and furnishes a fat, hot spark at all times.

Write for information.

DAYTON ELECTRICAL MFG. CO.
152 St. Clair St DAYTON, OHIO.



A low wagon at a low price. Handy for the farmer. Will carry a load anywhere a horse can travel.

Low Down Wagons

soon earn their cost on any farm.

Steel Wheels



for farm wagons. Straight or staggered spokes. Any size wanted, any width of tire. Hubs to fit any axle. For catalogue and prices, write to

Empire Mfg. Co., Box 300, Quincy, Ill.

LIGHTEN YOUR LABORS

BY USING A

STANDISH FOOT-POWER HAMMER.

Takes the place of a helper. You can do more work and better work.



Our Power Hammers give perfect satisfaction wherever used and they are doing good work in the best shops in the country. Drop us a card and we will send you **interesting descriptive circulars free. Write at once—today.**

The Standish Machine & Supply Co.,
COLUMBUS, O.

VISES



COLUMBIAN

DID YOU EVER TRY TO SUPPORT AN automobile wife on a wheel-barrow salary?

Presuming you did—didn't you find it unprofitable? Did you ever try to turn out high grade goods with poor tools?

Presuming you did—didn't you strike bottom hard and end up with a sudden jolt that put you on your feet?

Well, if you never did either one of these two fool things, take our warning and don't try it, as you are sure as fate to lose.

There is a good sound reason for our having a large and roomy plant of unusual perfection. It is because we know we can not give you the right kind of tools unless we use the best machinery and workmanship that we can possibly get. You will agree with us this far, will you not?

Here—in our spacious plant with its unchallengeable quality, are made vises and anvils which we call Columbian Original Trenton Wrot-Steel Solid Box Blacksmiths' Vises and Columbian All-Steel Anvils.

The word "Columbian" stamped on any of our products is the best symbol of quality to be found anywhere—it's absolutely guaranteed.

Suppose you had a vise that weighed 50 pounds—that is 50 solid, substantial pounds of good old hard stuff—steel, (and the vise did not weigh 45 or 46 pounds—as do most vises that are marked 50 lbs.) wouldn't it stand to reason that the real 50-lb. vise would help you more in tight pinches and strains without springing out of shape?

Isn't it reasonable that you pay for your vise according to what it weighs? We charge a little more, but in return give you guaranteed quality and a more useful article.

Columbian Vises and Anvils are correctly finished—that is, carefully painted and wrapped—highly polished.

Well, this is enough—if you are not thoroughly convinced now send for our catalog No. 16. It's interesting and educating. Sent free—anywhere.

If our Anvils could speak they would issue soft, silvery notes.

THE COLUMBIAN HARDWARE COMPANY CLEVELAND OHIO

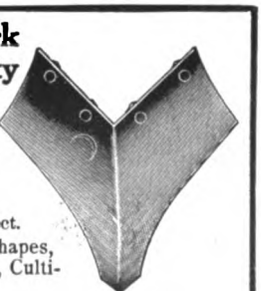


ANVILS

BRANCHES
168 Church St. NEW YORK
26 E. Lake St. CHICAGO

"CRESCENT" The Mark of Quality





Insist on the "Crescent" brand and if your jobber cannot supply you write us direct.

We manufacture a full line of High Grade Agricultural Steel Shapes, Fitted and Bolted Plow and Lister Shares, Merchant Plow Shares, Cultivator Blades, Subsoiler Blades, Landsides, etc., etc.

WRITE FOR CATALOGUE.

CRESCENT FORGE & SHOVEL CO., Havana, Ill., U. S. A.

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STEEL WRENCHES

Drop-Forged, Semi-Finished

Take nuts for $\frac{3}{16}$ to $\frac{1}{2}$ inch bolts. Full set of 5 wrenches by express, $1.50. Sample $\frac{1}{4}$ x $\frac{5}{16}$ by mail 25c. Write for catalogue containing useful information.

HANDY TOOL CO., 125 BELLEVUE, OHIO

"The Australasian Coachbuilder & Wheelwright."

A Monthly Illustrated Technical Journal circulating amongst Coachbuilders, Wheelwrights and Blacksmiths throughout the Commonwealth of Australia, New Zealand and South Africa.

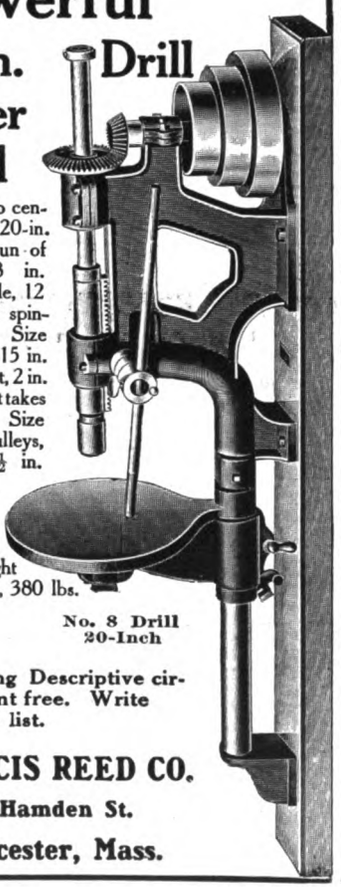
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J. E. BISHOP & CO.,

65 MARKET STREET,

Sydney, Australia.

Powerful 20 in. Drill Lever Feed



Will drill to centre of a 20-in. circle. Run of spindle, 8 in. Run of table, 12 in. Size of spindle, 1½ in. Size of table, 15 in. Size of post, 2 in. Drill socket takes 41-64-in. Size of cone pulleys, 6¾, 8½, 10½ in. Tight and loose pulleys, 8 x 3 in. Total weight of machine, 380 lbs.

No. 8 Drill 20-Inch

Interesting Descriptive circulars sent free. Write for price list.

FRANCIS REED CO.

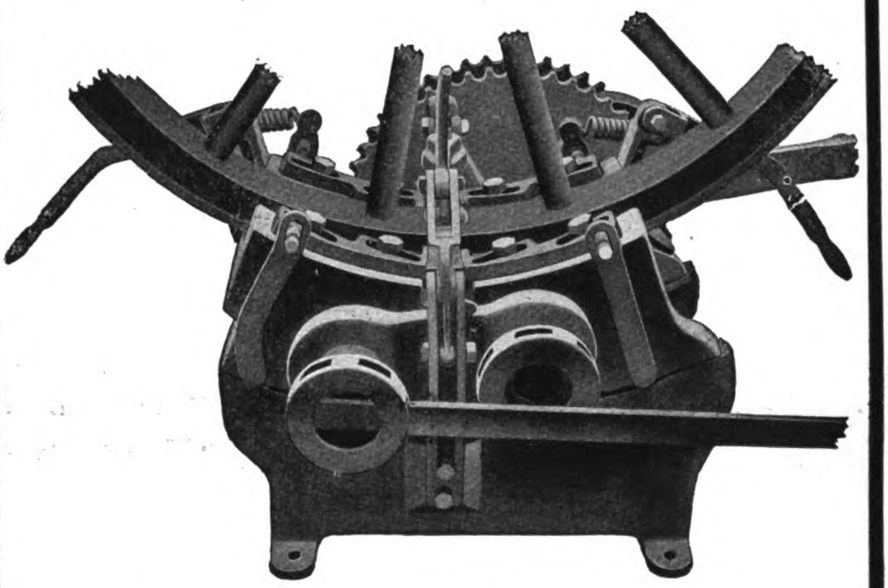
43 Hamden St.

Worcester, Mass.

ARE YOU AWAKE

to the fact that your customers can be organized into a body of ardent advertisers for you? **THE BROOKS WILL DO IT?** Every customer concedes its superior work over all others and knows that it cannot be duplicated in any other way. They are so well pleased that they talk it to their neighbors and they become your customers and advertisers, thus it forms a growing chain of advertisers for your business. Nothing can be added to your shop that will increase your business as the Brooks will. Boom your business by getting one now. It is the acknowledged superior of every other make. It is the only one that has stood the Government tests and in use in the United States Government shops.

The Brooks Cold Tire Setter



Adopted by the United States Government

Sets tires 4½ inches and all smaller sizes

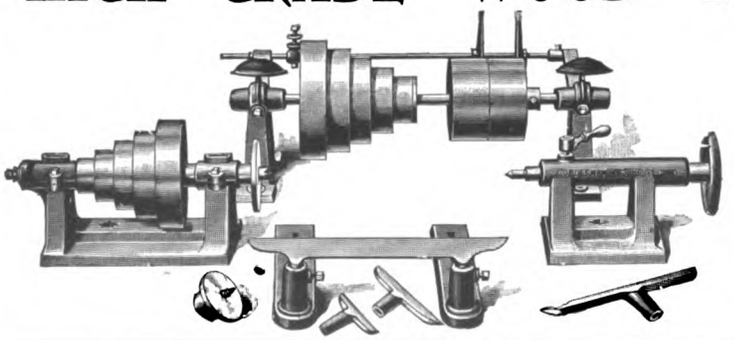
once in your shop, eliminates all chances for a miscalculation and dissatisfied customers. They all become your advertisers and talk your machine.

The Brooks is the most durable and most powerful machine ever offered to the trade. It has an automatic grip key tightening device, which no other machine has. It is mechanically constructed in every detail. It is the result of the long experience of the oldest builders of edge grip cold tire setters. Our machines far excel anything ever built in the cold tire setter line. No other machine does its work so well, so easily and so quickly and is as durable. Our descriptive booklet, special terms and a handy vest pocket memorandum book sent free for the asking.

THE BROOKS TIRE MACHINE COMPANY

121 North Water St. **WICHTA, KANSAS.**

HIGH GRADE WOOD TURNING LATHES



Uncle Sam buys Cordesman-Rechtin Wood Lathes—because they are convenient, substantial and durable machines capable of the hardest kind of turning at high speed. Because they prove a credit to his shops and are just as Cordesman-Rechtin represent them. Therefore, why should you not follow his good example?

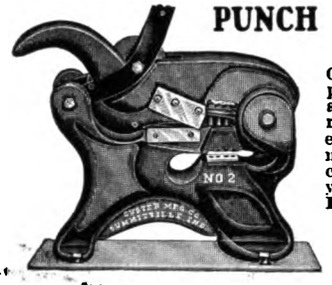
If you are in need of a good Lathe or anything else in the wood working machine line we have some interesting information for you.

THE CORDESMAN-RECHTIN CO.,

CINCINNATI, OHIO.

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THE NEW CUSTER PUNCH AND SHEAR



Combines important points not known to any other machines made. The most powerful machine on the market. Drop us a card and we will tell you all about it.
For sale by jobbers.



THE HANDY TIRE BOLTER.
Handiest and most convenient wrench made. Each wrench is equipped with 3 size sockets, ⅝, ¾ and ¼.

CUSTER MANFG. CO.,
SUMMITVILLE, IND.

HONEST DEALINGS.

Before an advertisement is accepted for this Journal, inquiry is made concerning the standing of the house signing it. Our readers are our friends and their interests will be protected. As a constant example of our good faith in **American Blacksmith** advertisers, we will make good to subscribers loss sustained from any who prove to be deliberate swindlers. We must be notified within a month of the transaction giving rise to the complaint. This does not mean that we will concern ourselves with the settlement of petty misunderstandings between subscribers and advertisers, nor will we be responsible for losses of honorable bankrupts.

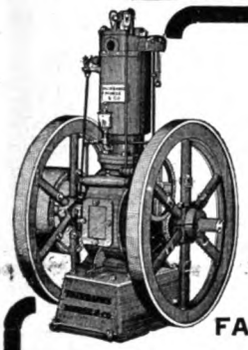


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NO MATTER

where or upon what you are working
The "Pittsburgh" Double-Swivel Vises
Will DO the work. Ideal as a chuck.
Removed instantly. Turns in any direction.
The Pittsburgh Automatic Vise & Tool Co., Pittsburgh, Pa.





Look Ahead

The far sighted blacksmiths are closing their 1907 contracts for

Fairbanks-Morse Gasoline Engines

Why not be an agent and install one in your shop where you can show it to the best advantage. They are so **Reliable** and so well known you can't help making money. Send for Proposition No. 457AP.

FAIRBANKS, MORSE & CO., CHICAGO, ILL.
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A Dollar an Hour Instead of A Dollar A Day



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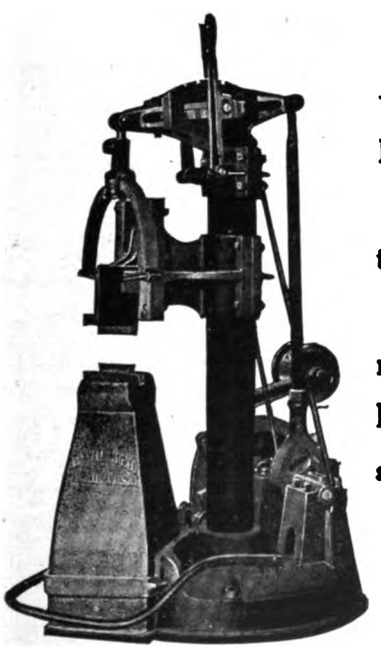
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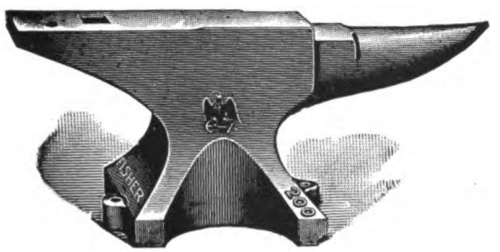
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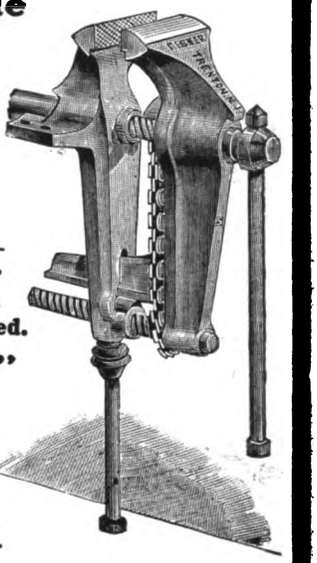
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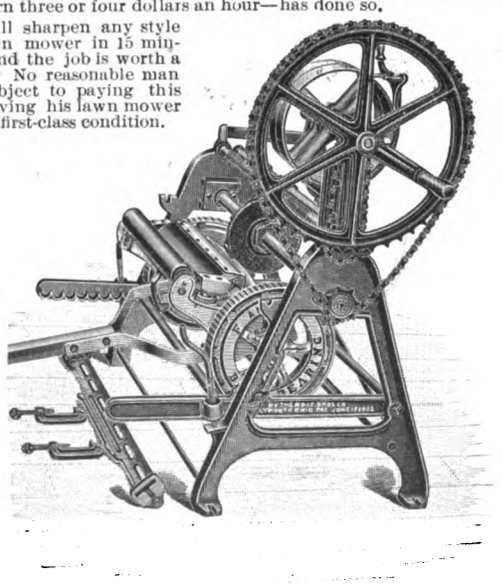
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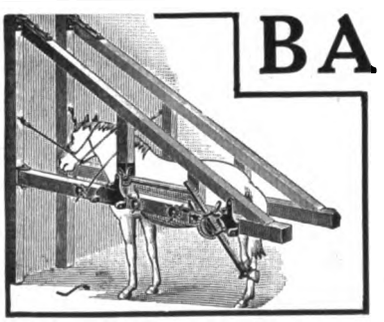
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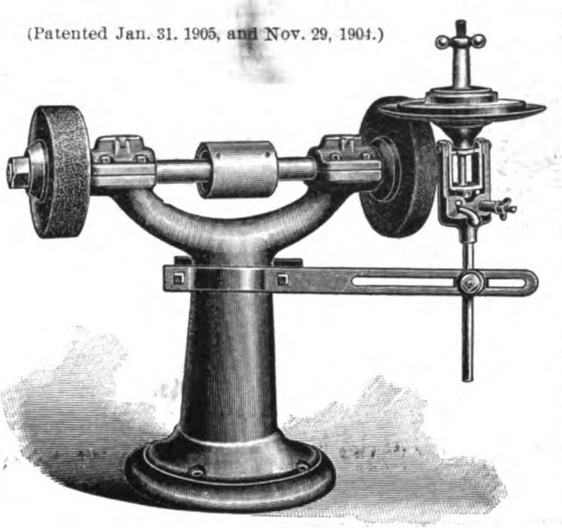
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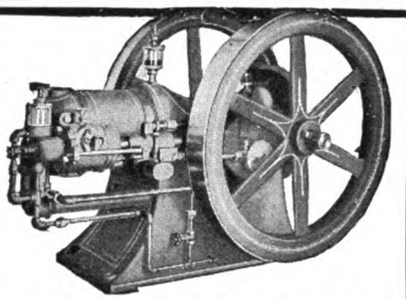


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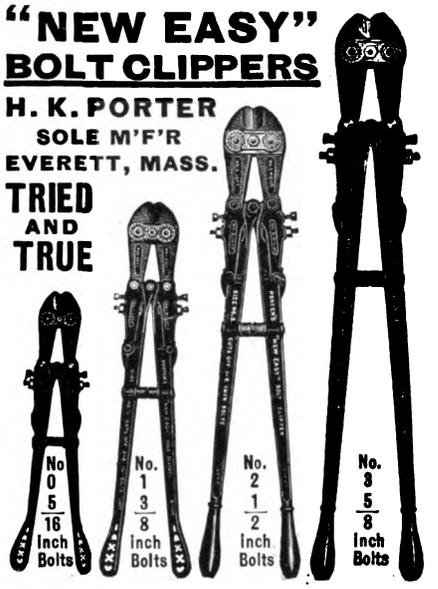
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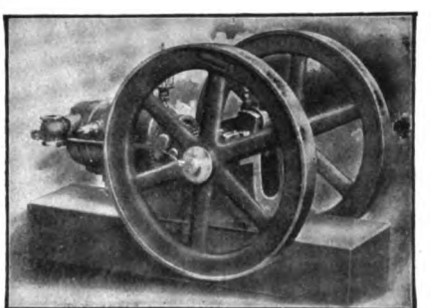


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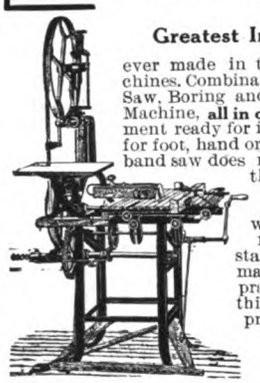
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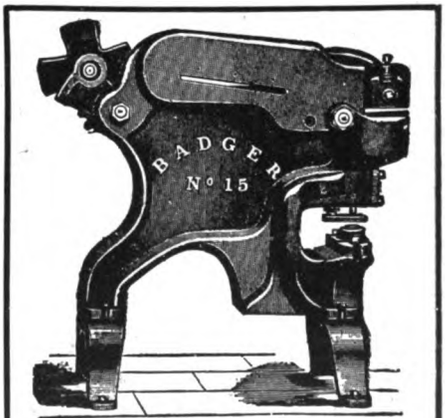


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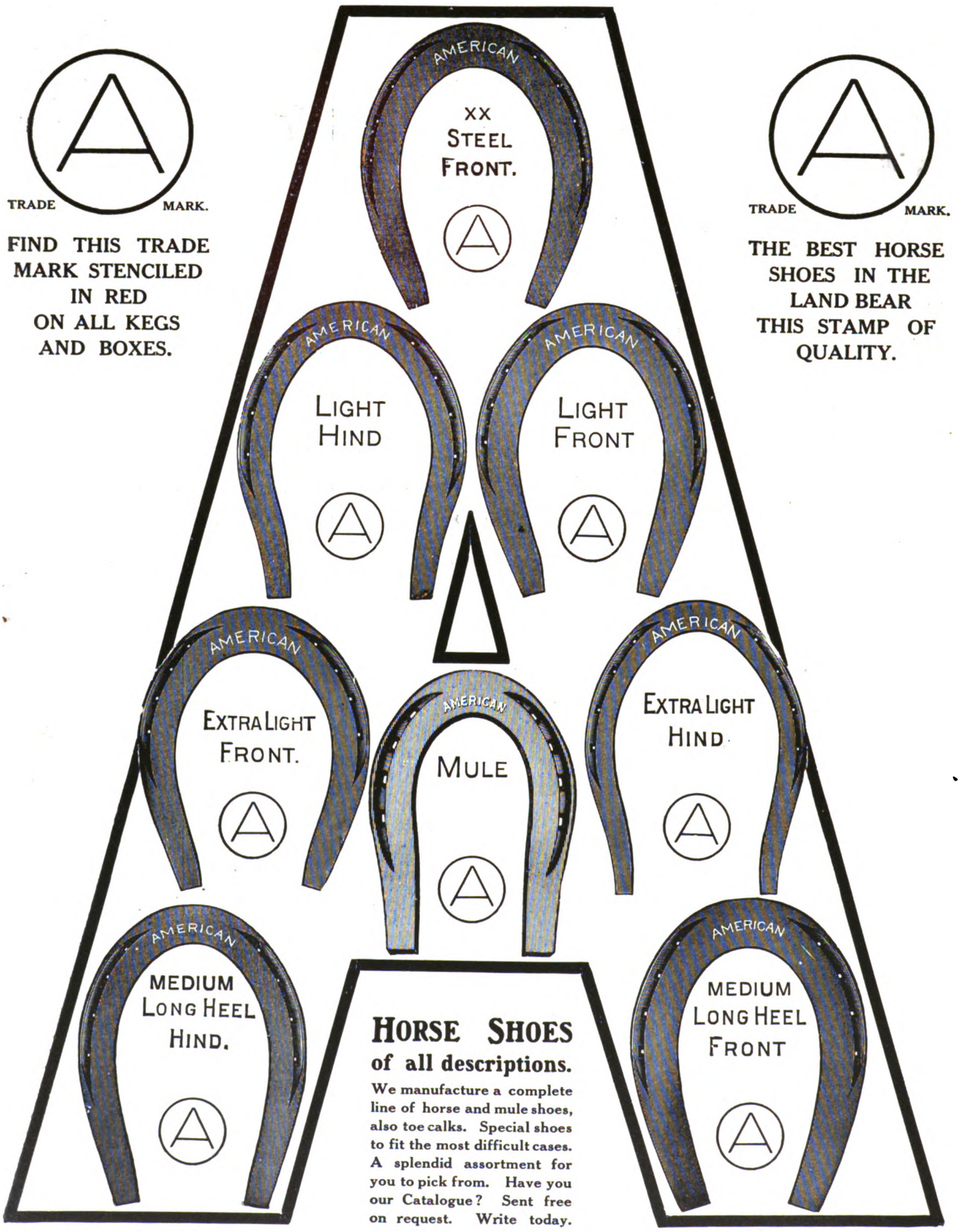
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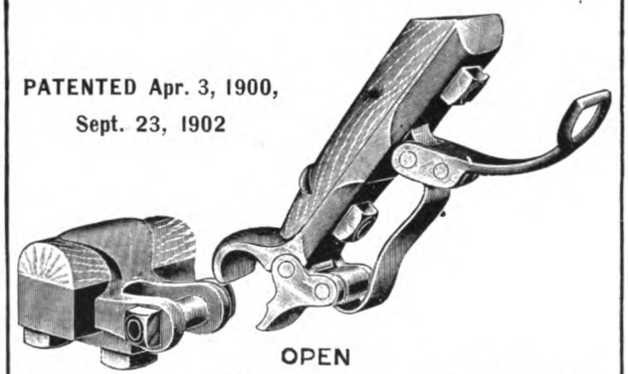
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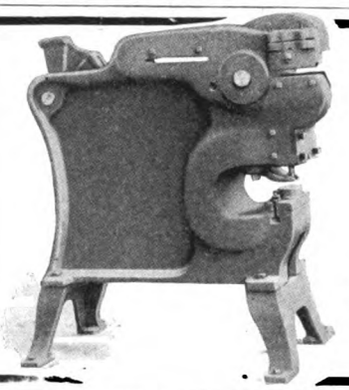
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Shears 5 in. x ½ in. flat iron bars.
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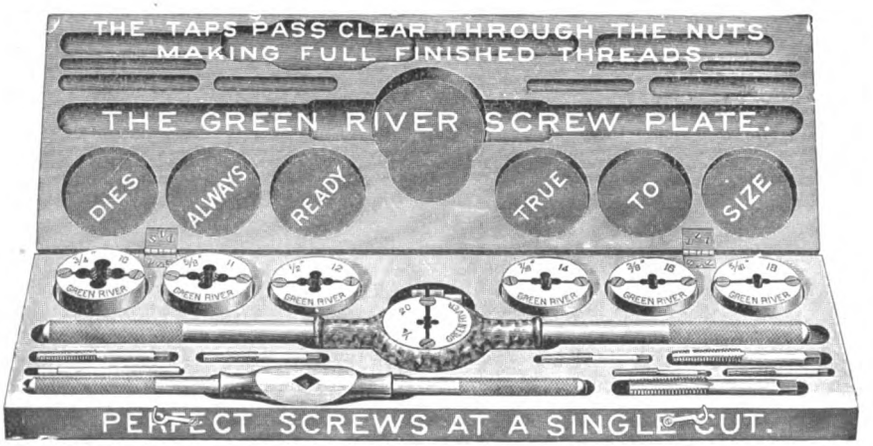
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Your special attention is called to the article on page 109 of this issue. Act now.

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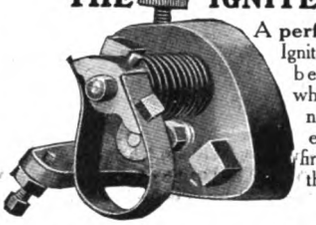
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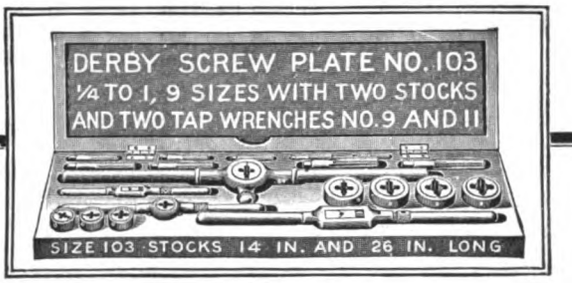
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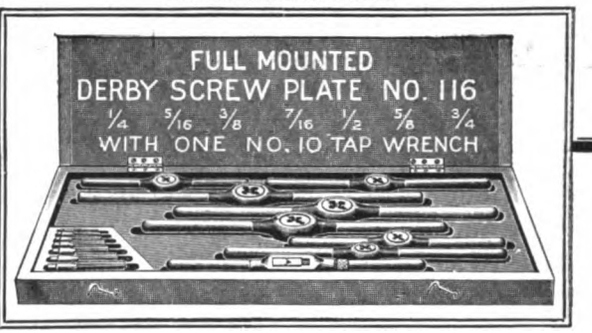
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That "Our Journal" is of educational value is being proved more strongly every day. One of our subscribers advises us that he has just passed an examination for instructor in blacksmithing in a large manual training high school. He says: "I received considerable valuable information from the pages of the American Blacksmith, and would advise brothers of the craft that they will be much benefited by spending a few hours of their leisure time in studying their trade." Craftsmen everywhere are strong in their praise of "Our Journal," and it is highly gratifying to know that our foreign brothers, as well as the American smiths, fully appreciate the value of our journal. Mr. George Smith, of New Zealand, for instance, says: "As a New Zealander I wish to add my tribute of praise with regard to your excellent paper. I'm always anxiously awaiting its arrival. My business is that of a horseshoer and general blacksmith and I cannot afford to do without such a valuable asset as THE AMERICAN BLACKSMITH."

The number of articles submitted in our recent contest, and the high quality of each, made the awarding of prizes very difficult. The contestants whose articles, in our judgment, are entitled to five dollar prizes are: Mr. Dayton O. Shaw, of New Hampshire; Mr. C. W. Metcalf, of Iowa; Mr. Michael Breen, of Ireland; Mr. Tom Fugua, Jr., of Arkansas, and Mr. John J. Campbell, of Colorado. All other contestants whose articles are published will receive one year's subscription to "Our Journal." Space does not permit us to enumerate the winners of these subscription prizes, but each will be duly notified of his award. In this connection let us again remind our readers that good practical articles of craft worth are always needed, and we want you to write us just as often as possible. Our special wants just now are shop pictures and photographs of original ornamental iron work. These are to be used in early issues, and we desire to hear from every interested reader.

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Articles on ornamental iron work have been appearing in our columns for some time, and they certainly must have interested at least some of our readers sufficiently to encourage them to try their hand at this work. And, believing that our readers would like to have their work pictured in our columns, we are going to get out an ornamental iron edition and want our readers to assist us in making this special issue just the finest and best ever published along this line. We should like to have photographs of hand wrought work, together with descriptions and instructions as to making the articles. All our readers are more or less interested in this branch of smithing and we will look to you, Mr. Reader, for something along this line.

The pink buffalo stamps grow in popularity and the good they do. A recent request from a Pennsylvania smith reads: "Please send me some more buffalo stamps. I find that they save many times the price of the paper." THE AMERICAN BLACKSMITH insists upon fair treatment for its readers, and not only guarantees the reliability of all concerns whose advertisements appear in its columns, but will back up any blacksmith who may be treated unfairly by other manufacturers and supply houses. A pink buffalo stamp attached to a letter or order to a manufacturer or dealer, not only means that you are a reader of THE AMERICAN BLACKSMITH, but that THE AMERICAN BLACKSMITH insists upon your receiving a square deal. Fresh lots of these stamps are furnished to our readers without charge, and we want you to use them freely. Of course we can guarantee reliability only of our own advertiser patrons, but we will do all in our power to secure honest treatment for you in your dealings with any manufacturer or dealer. Hence, use the stamps to let the firms with whom you are dealing know that you are progressive and up-to-date.

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THE MASSIVE PLANERS AND OTHER ITEMS OF STONE MILL EQUIPMENT REQUIRE THE REGULAR ATTENTION OF THE SMITH

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Quarry and Mill Operations

The Part the Smith Plays

J. C. LAMONS

DESPITE the recent and almost miraculous success of concrete, the stone industry has continued to grow and expand, and as the demand increases both in quantity and size for stone, granite and marble, so the demand increases for larger and improved machinery, tools and appliances. Inventive genius has not been asleep as regards the stone industry. It has given the modern channeler machine, the diamond saw, the planer and many other machines, tools and appliances.

The diamond saw, as its name indicates, has the teeth set with diamonds of an inferior quality. They are made in such a manner so as to be easily removed in order to renew them, or to replace when one has been thrown out. The saws are usually 5/8 of an inch thick and 7½ to 8 feet in diameter, and run about four hundred and fifty revolutions per minute. It cuts the hardest stone as though it were wood. There is a continuous stream of water pouring on the saw while cutting, to prevent the teeth from heating.

The planer with its four massive heads is a very important machine in the stone mill. There are several types of this machine, each constructed for its particular work. For instance, the circular planer which finishes arches and any design in circular work, and the header cuts return molds and joint stone. The lathes for turned and fluted work are built somewhat on the regular machine shop pattern, only they are more massive and the feed is much faster. The range of work for these lathes at this plant is from the smallest urn or baluster to a fluted column, nine by twenty-four feet. These planers, headers, lathes and the like require no end of tools, so the blacksmith has many tools to make. Besides the tools for the machines, the smith is required to make all kind of stone-cutters and carvers, tools, hammers, drills, scabling picks and the fixtures for derricks and saw gangs.

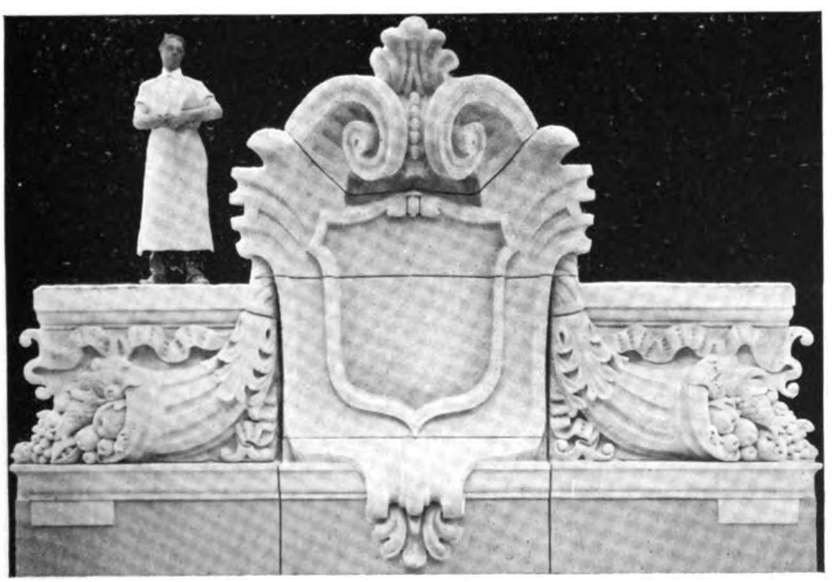
I will give a few pointers on how to make and temper tools required at a stone plant. The engravings will give the reader some idea of the shape of some of the tools required. No two jobs are ever alike, so when one job is completed, the tools are placed in the stock rack until they are needed to be worked into other patterns. The smith selects the tool nearest to the pattern to be forged. As the steel is cut away very fast in making the molding tools, the smith must use great care in selecting each piece of stock. All tools must be made exactly correct, so a metal pattern is furnished the exact size of each mold. The tool is forged to the proper thickness, the pattern placed on it while the tool is hot and it is marked out. It is then nicked with a cutter, reheated and cut out. We have several hot cutters of various shape to cut the different curves and small angles. The tool is now laid aside to cool and is then ground to fit the attern expactly.



THE SMITH IS REQUIRED TO FORGE THE NEEDED TOOLS

For molding tools the steel comes in bars from 1 by 2 inches to 1 by 6 inches and up to 12 inches wide. This is usually cut in lengths of 22 inches, from which the molding tools are forged. The planer tool at B shows the general form used, and is made from stock 1 by 4 inches to 1 by 12 inches. After being cut to length, the bit is forged out to gauge by first peening so as to spread the tool. The idea is to make it as wide as the stock will permit. After the tool is forged, about six inches of the forged end is bent at an angle of forty-five degrees. It is then allowed to cool and is ground in an automatic grinding machine. After being trued up with a file, it is ready to temper, which is done as follows: The tool is heated to a dull red and plunged into hot water, allowing the tool to remain just as hard as possible, for it is to be cooled at a low heat. It requires daily practice to learn at what heat to cool the tool. They seldom break, and when they do it is usually careless heating when hardening that is at fault.

The 8 by 10 and 15-inch tools are troublesome, as they are liable to warp when they are hardened. The way we



THE BEAUTIES OF CARVED STONE ARE IMPOSSIBLE WITHOUT THE AID OF THE SMITH

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overcome this is to bend the tool slightly in a true radius from the face or cutting side and, when it is hardened, in nearly every case it returns to its proper shape. A number of these tools are made to produce "tool" work, work that has little ridges or corrugations planed into the surface to relieve its looks. Thes ridges range from four to sight to the inch. None of these tools can be hammered after being tempered, so it is very important that the smith be familiar with the steel, and that they be forged and tempered true. In forging these tools, we heat to as high a heat as steel will stand without overheating or burning. When we temper we use as low a heat as possible, to get the steel to harden.

The molding and lathe tools are tempered in very much the same way, only it is often necessary to draw the temper on the molding tools to a straw or a blue color, owing to the shape, the shape always governing the degree of hardness. In the engraving B is a "drove" tool for planing tool work; C shows one of the molding tools; E is a set of lathe tools required to turn a baluster; and F shows the various styles of hammers used in a quarry and mill. We forge most all of our tools used at either the quarry or mill, as they are far superior to the "ready-made," and they have the proper weight, shape and individuality that no factory tool has. At G is shown a common form of scabling pick which are used in great quantities about quarry or mill. They are made of stock 1½ inches square. The bar is marked off in spaces of 7 to 8½ inches, depending on weight of pick. The eye is punched in such a manner that it is unnecessary to wedge the handle in; in other words, the eye is forged tapering.

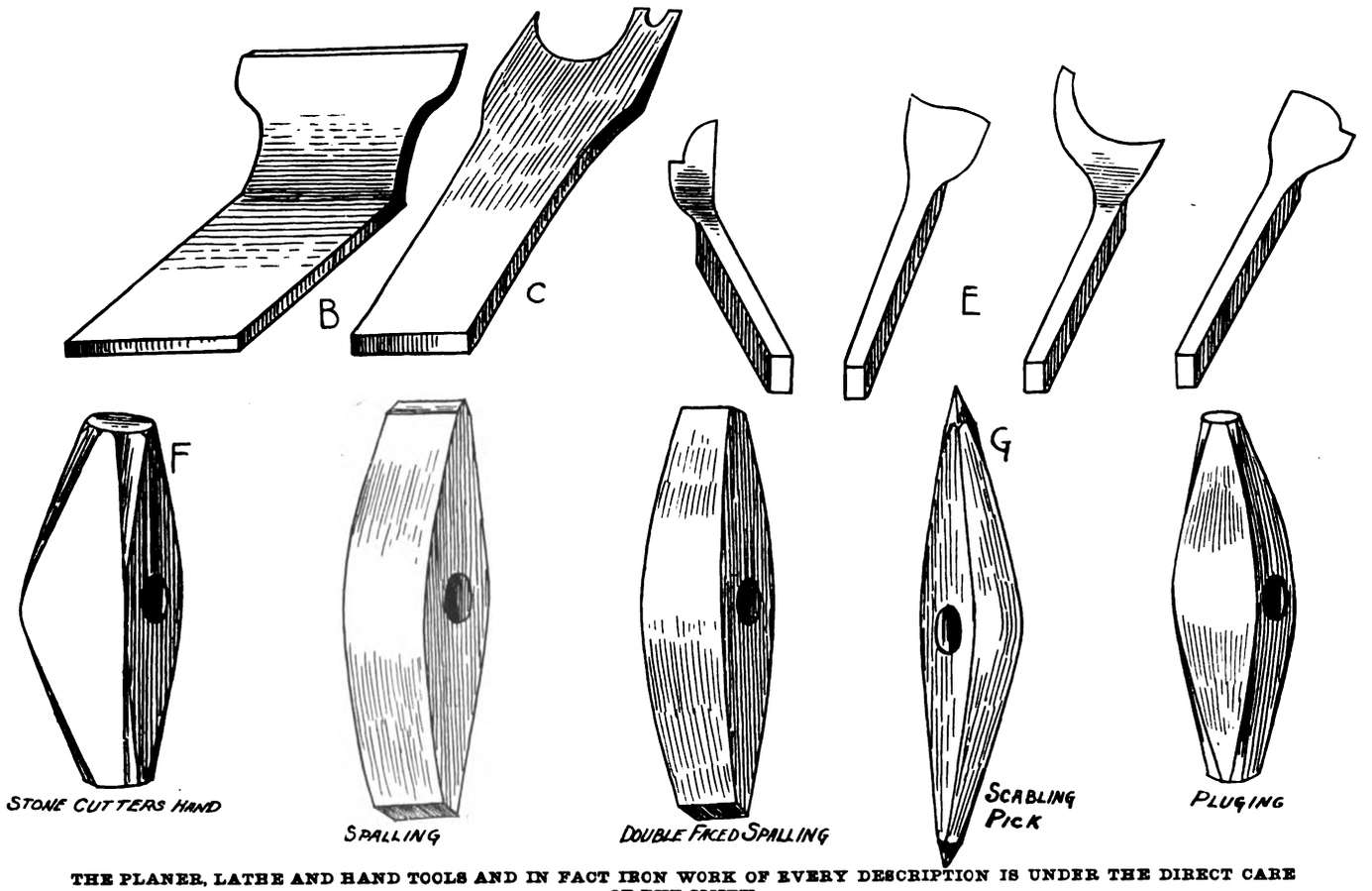
Carvings, such as the eagle and cartouch shown in the engraving, are copied or modelled after plaster models of full size, which are furnished the carver for each pattern. These models are made in the artist's studio from specifications furnished by the architect. There are no special methods in forging the tools used in carving, as the carvers usually have tools made to suit their own liking. They are generally tempered to a straw color.

Cleanliness and its Relation to the Blacksmith.

RICHARD O'HEARN.

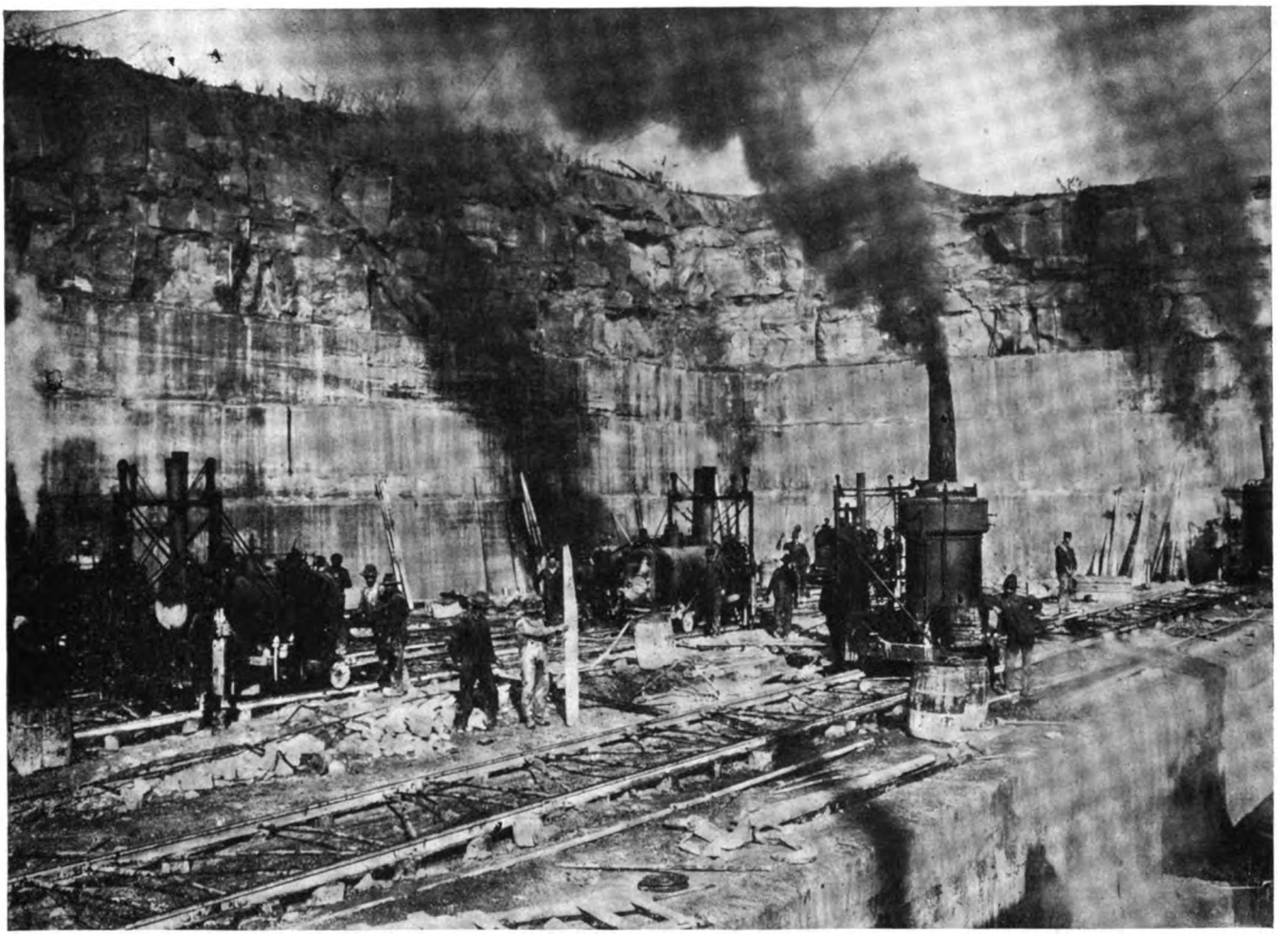
It is just as much a mistake to suppose that, to be a good workman, one must acquire all the dirt possible in the least possible time, as it is to think that one who does not measure up to this rule will not amount to much as a mechanic. I can truthfully assert that the best mechanic I ever met was also the cleanest, and the "botches" in my path also took the prize for dirt. Right here is a part explanation of the scarcity of good, bright boys to learn the trade—of which more will be said shortly.

Let us first discuss the smith who scoffs at clean clothes for the shop. Be it understood that there is nothing personal in this article, though there are a few who will take it as a particular reference to themselves. There, however, are enough of a certain brand of smiths to furnish material for a general treatment. We need draw little upon our imaginative powers to picture a member of the class of unkempt smiths. He seems to make it a point to collect as much dirt and grease upon his clothes and person as possible. His street shoes are his shop shoes, and he knows nothing about changing clothes for shop or street. Two lines of old doggerel come to my mind. "He has two suits of clothes—'tis a wardrobe complete. One for the shop and the same for the street." His slogan seems to be: "You must get dirty and stay dirty to do good work. Anything is good enough to wear in the shop, and what's the use of changing just to go home to supper and to bed." He no longer thinks it necessary to clean up for his wife's sake. That day with him was long ago forgotten.



THE PLANER, LATHE AND HAND TOOLS AND IN FACT IRON WORK OF EVERY DESCRIPTION IS UNDER THE DIRECT CARE OF THE SMITH

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THE QUARRY WITH ITS PUFFING ENGINES AND BURROWING CHANNELERS ALSO SHOWS THE MARK OF THE SMITH'S HAMMER

After supper, he goes down to the corner and talks shop or politics, until the crowd begins to melt away. Then he goes home, lays aside his dirty outer garments and goes to bed. Would you like to have your son apprenticed to that man? Not if I had 25 sons would I allow one of them to work under him. And I doubt, furthermore, if any of the supposed 25 could be forced or persuaded to do it. What self-respecting, sensible boy would cub for such a man? An ambitious boy would naturally think, "Well, if I have to serve an apprenticeship of three years to get to look like that, I beg to be excused."

Let us now take up the man who in his dress and habits is helping to keep the profession respectable and respected. Every morning he goes to work in clothing clean and neat enough for any business man's office. Arriving at the shop, he changes from top to toe. He has a box big and long enough to hold his "glad duds." The change is made in five minutes. I know a few of this sort who, in warm weather, always keep two or three clean light undershirts in that box. His coat, vest, trousers, collar, tie, hat, and shoes are carefully put away. Clean overalls are pulled on, large comfortable shoes take the place of the neatly fitting ones just removed, and he is ready for work. At noon his wash-bucket and soap come into play. He removes his sweated shirt, gives his body a hasty wipe with a crash towel, puts on a dry shirt and his street garb, and, if he lives convenient to his work, steps into his house as clean as when he left it that same morning.

Returning to his shop after dinner, he changes clothes as he did that morning. Two or three times—sometimes oftener—during afternoon or morning, he washes his hands, after an unusually dirty piece of work. This gives him the comfortable feeling known to all cleanly mechanics and, moreover, keeps the handles of his tools clean. His wash bucket is always handy, and in his locker are a couple of clean towels, a shoe brush, and a clothes brush. Having kept off the worst of the dirt during the day, it is no trouble for him to get himself perfectly clean, hands and all, when preparing to leave the shop for his home at evening.

In summer and late spring and early fall, he bathes six times a week, in winter twice, and every night in winter bathes his feet. He shaves three times a week, and keeps hands, face and neck fresh looking, smooth and clean, as if he were only 22 instead of 48, and worked in an office instead of a shop. He never goes home from his work a whit less clean and well dressed than when he was courting the girl who now is, and long has been, his wife.

I know one smith who, during the warm days of summer, spring and fall, goes to his shop dressed in white from head to foot. He goes home to dinner and to supper same way. He's the best carriage smith I ever met, and I've met a great many. He owns his own residence and the spacious grounds around it, and owns his place of business down town. He works at the anvil, and his hands are as soft and white as a gamblers. He takes a half dozen magazines, a daily paper, two county papers, and how many other papers he hardly knows himself. He is a prosperous man. He

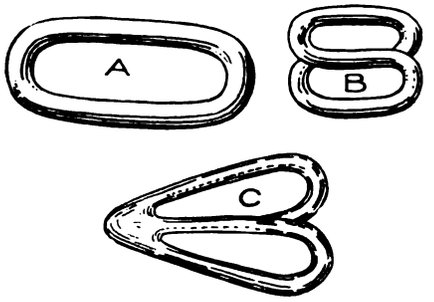
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is fairly well fixed and never refuses, when collections are taken for the needy. He does not look upon the wine when it is red, nor yet upon the whisky when it is mellow and rich and amber. He does not gamble. Now note this: If he drank or gambled, he would not long own his suburban home or town shop, nor would he long know whether he was dressed in greasy shop clothes or snow white duck, and the picture first painted in this article would fit the case. Suppose, however, that these two brands of smiths are equal in sobriety, honesty, industry and skill (which is quite too much of a stretch of imagination), is there any question as to which of these is the more potent factor in making for the dignity of our calling? While the one is a libel on the trade, the other is an honor, and a splendid example for the embryo vulcans in his city, and has no complaints to make on account of lack of 'prentice boys. If, as we are sometimes told, "Cleanliness is next to Godliness," what is to be the condition of him who will not avail himself of the saving grace of soap and water?

How to Temper Knife Blades.

H. T. F.

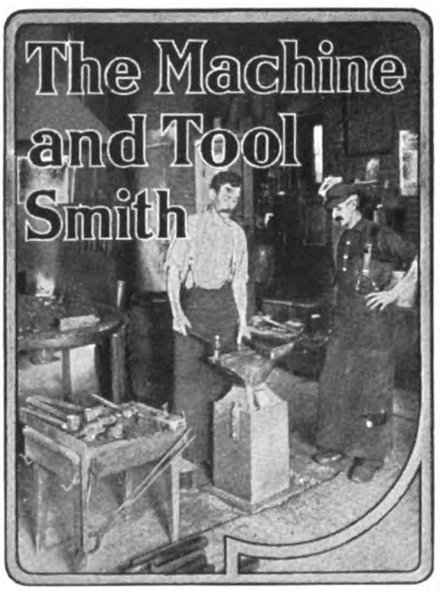
I have been very successful in tempering blades for the past fifteen years. I have a razor that I made and tempered and which I had hollow-ground. Several barbers have shaved with it and say it is as good as any they ever saw. My method is as follows: Shape blade to desired shape and leave thick enough to grind out all hammer marks. Get two pieces of boards about ¾-inch thick and long enough to cover the entire blade and two inches wider. Now heat blade to low cherry-red, place between the boards, catch them all with two pairs



A CENTERCLIP FOR SINGLETREES EASILY MADE

of tongs, near the ends, and hold in water until cool. The temper will be as hard or as soft in proportion as the boards were. For example, if you want a hard temper use oak, if soft is wanted use white pine and so on.

I make a centerclip for single trees that gives good satisfaction. I proceed thus: Take 2½ inches of round iron, bend in center and weld same as a chain link at A. Now bend the link in the center at B, bringing ends together, and weld. You can put in a ring or not, just as you wish. Spread the two bends at X about 3 inches apart.



Hardening and Tempering Steel.—15.

E. R. MARKHAM.

Mild Steel and Machinery Steel.

Bessemer attempted to produce wrought iron by passing cold air through molten pig iron, as he found by experiment that the temperature was raised by this process. But he found that the metal taken from the furnace at that point was worthless. By adding carbon, the product was much superior to wrought iron for most purposes. The amount of carbon that may be added to the product of the converter, is under the control of the furnace man.

The open hearth process is carried on in what is called an open-hearth furnace in which the iron is melted on the hearth by means of a flame of gas and air which passes over it. This gas and air is at a yellow heat, and burns with an intensely hot flame. While various percentages of carbon may be added to Bessemer steel, yet it is generally employed in producing only medium and low carbon steels.

The percentage of carbon in open-hearth steel varies from .15 per cent to 1. per cent, and even higher, and may be used to excellent advantage in making car and wagon springs, and many pieces that must be hardened, as the higher tempers may be hardened as hard as crucible tool steel, and for many purposes it answers as well. Indeed, many cutting tools whose form insures strength, give excellent results when made from this steel. However, tools having light, delicate portions, or which must be subjected to great strain, should always be made from crucible tool steel.

As to the terms "mild steel," and "machinery steel," they are in most shops used synonomously, and are understood to apply to the products of the Bessemer converter and open-hearth furnace, but in reality they are the products of either, that are low in carbon, or are used in the construction of machines. For it is possible to give either Bessemer or open-hearth steel a high percentage of carbon, and in such case, it could not be called "mild steel." Certain parts of some machines are made from either of the kinds of steel just mentioned, and which are very high in carbon, to allow of the pieces being hardened. It is customary in such cases to designate the kind of steel and the percentage of carbon it contains, and might be designated as follows: 60-point Bessemer steel, or 80-point open-hearth steel. So it is apparent that the terms "mild steel" or "machinery steel," while very generally used, in reality mean but very little, unless the carbon content and the kind of steel are stated. However, in many shops the terms are understood as applying to steel, either Bessemer or open-hearth, which contains .15 to .25 per cent carbon.

As it takes only from seven to twelve or fifteen minutes to blow a charge of Bessemer steel, and but two charges a day are taken from an open-hearth furnace, the cost of the latter is greater. However, it is more reliable, tougher, and, low in harmful impurities, may contain a much higher percentage of carbon with safety, and carbon gives the steel strength. If steel is not to be subjected to great strains, or to shock or vibration, and is not to be hardened, it is possible that the lower priced Bessemer would answer as well as open-hearth. However, it would not be possible to state what stock would answer for a certain purpose, unless the purpose were known.

The above has been given as a very brief outline of the means of manufacture and the adaptability of the various kinds of steel on the market. In order to thoroughly understand the subject, it would be necessary to understand the different processes used in making both the Bessemer and open-hearth,

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as both are made by what is known as the acid process and the basic process, the product of each being different and adapted to different uses.

Tools for Forging Wire Eye Deck Pads.



C. H. RICHARDSON.*

Eye-pads are placed on the deck, rail and spars of all vessels. To a few, permanent fastenings are made, but the majority of them are so arranged that at any time a block or tackle can be made fast. So it is very evident that a poor weld will not do here. The best of stock is required, for even the designer cannot tell how severe a strain will be placed on them. The person making fast the tackle has nothing but the appearance of the eye-pad to go by; so it is up to the mechanic to make the forging good, inside as well as out. I have forged these eye-pads about every possible way, and present the accompanying plans as about the best method. It will take a first-class ship-worker one and a half hours to make one of these forgings, out of the solid, as it should be done. The tools will make twenty finished forgings of the size shown in five hours. The pads are 6 inches by 10 inches by $\frac{5}{8}$ inches thick. The eye is $3\frac{1}{2}$ inches in the hole, the diameter of the round being $1\frac{1}{4}$ inches.

Referring to the engravings, A B shows two views of the eye-pad. C D E shows three views of the tool that forms the pad. It is of this tool I wish to speak particularly. At the first inspection, the die appears to be an expensive tool for the average shop, but, considering the out-put and the comparative ease with which it is handled, it has proven to be a cheap tool to anyone who has more than a dozen of these forgings. This number will more than pay the cost of the tool.

The construction of the tool: Take two pieces of stock (50 carbon steel) large enough so that when sunk with molding eye, there will be a margin all around the eye equaling two and one-half times the diameter of the round stock in the eye. In this case 2.5x1.25 equals $3\frac{1}{8}$ on a side. The tapers on the end and side shown at R S T V, Fig. 1, are made by using taper tools ($\frac{3}{4}$ of an inch to the foot is a good form for this work. It allows the clamp band to be taken off easily). After the stamping eye is sunk in the two tapered blocks (this should be done at once), the pad form is laid on, one piece at a time, and sunk to the required depth. The die is now heated all over, the eye laid in, and also the pad. The whole thing is now finished off in the taper tools. The holding band, or strap, that keeps the die from spreading while in use, is made of nickel steel. This band is made out of solid stock and, as in case of all solid bands, the required stock being known, and the distance laid off on the bar. When the piece goes to the hammer, a small bit is worked down on which to weld the handle. Two holes are now punched equal distances from the side and ends. The bridge is now cut out, and the hole pinned out round until it is large enough for the mandrel of the hammer saddle to fit in loose. Now reheat, place on saddle and round out. Then draw the ring so it will be large enough when flattened to go on easily over the die. When the handle stub comes up straight under the hammer so it cannot be hit without injury, a bolster should be placed on the pin. The addition of the bolster reduces the thickness and gives the whole band an equal thickness throughout. The band should now be heated and flattened so it will slip on easily. Now reheat and work the band so it fits closely to all points of the tapers on the die block, leaving it in place till it begins to get cold. Then drive it off and weld the handle in place. The tool is now ready to be dressed off with a file so all parts work smoothly. The tool is now ready for its work of pad forming. The pin marked H, shown in Fig. 2, is a great help when putting the tools together. The center of the dies meet instantly, thus causing no delay whatever in the operation.

The eye stamping die is much easier to make; there being no outside strap or band, no clearance tapers are required. The blocks before stamping should be of the proportion already mentioned. In stamping the inserted eye, no matter how carefully the material is calculated, or how straight the work is placed in the tool, there is sure to be a thin fin wherever the tools meet (as in the case of all drop forgings). To overcome this difficulty, a fin groove is chipped in each half of the die as shown at I J, Fig. 2. This groove should be no less than one inch by one-sixteenth. This will give a fin groove one inch by one-eighth, and it will be found to be the most satisfactory size for all tools of this type. The pin holes marked P are to keep the die straight, that is, to prevent over-lapping the forging. The holes for the handles should also be drilled. The handle is then put in, and with a coarse center-punch, the hole is calked in about the handle. All sharp edges should be rounded on this style of a die to prevent over-lapping or cold shuts.

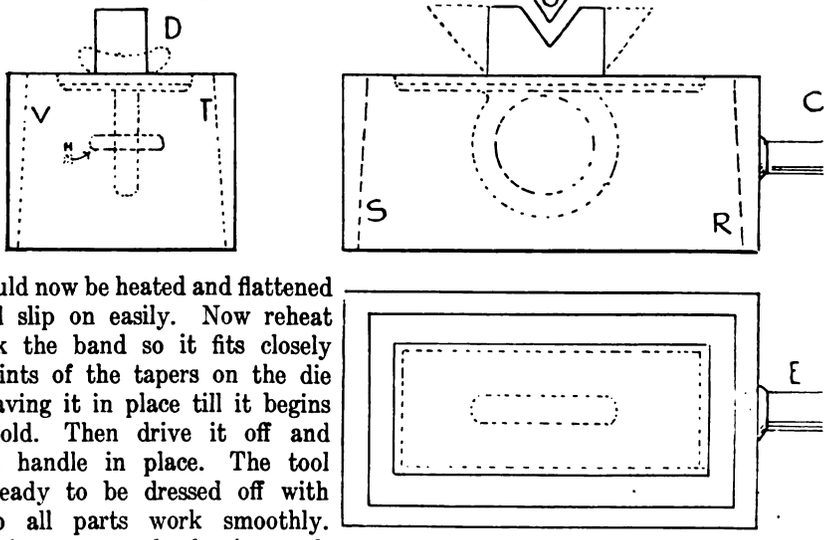


FIG. 1—THE EYE PAD AND THE FORMER

The tools being completed, we now select the stock of such an area as will not require a length that when the eye is finished and placed in the padding

* Mr. C. A. Richardson was born in Newton, N. J., October 10th, 1874. His elementary training was gained in the wagon shop, while his knowledge of the heavier branches of smith work was acquired at Brown and Miller's Engine Works, at Paterson, N. J. A four-year foremanship of a Staten Island ship yard ended when he accepted a similar position at East Weymouth, Massachusetts, where he is now located.

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tool, it will not buckle and bend over so it is necessary to take the forging out and straighten it. Having the proper material, estimate the stock required in the eye as follows: Consider the example as if there were no pad. Also think of the eye being made of square stock $\frac{1}{8}$-inch smaller than the required diameter. In this case $3\frac{1}{2}x1\frac{1}{8}=4\frac{3}{8}$. $4\frac{3}{8}x3\frac{1}{2}=$the circumference $14\frac{1}{2}$. Having the circumference, we next want the area. So, squaring $1\frac{1}{8}$ and multiplying by the circumference ($14\frac{1}{2}$) we have the area as follows: $1\frac{1}{8}x1\frac{1}{8}=1\frac{17}{64}$. $14\frac{1}{2}$ x $1\frac{17}{64}$ is 17.71 area, or required amount. Now, with a round punch flattened on the point so it will swell the hole, punch the hole and nip the end off round as shown at F. If the piece is revolved while working, the end will become rounded off when placed in the tool. A much better fit is acquired than if done otherwise. The holes should not be pinned out large enough so they will fit in the tool at once. The die does not increase or diminish the the size of the forging; so it is necessary to fit the work to the tool as near as possible. Now, with a heat just as high as the material in hand will stand, place in tool and drive them tight together. A little grease put in the tools before stamping is a great help when separating them. Now, by shoving the die from under the hammer, so just the handle rests on the hammer die, tap the stamping die with a sledge on the side; they will separate readily. The fins must be cut off next. To do this under the hammer, have a plug for the inside of the eye the full diameter. When finished, this plug should be slightly tapered to allow for clearance. The cutting end should also be hollow ground. To make free cutting, set this tool in place and with one blow cut the eye clean on the inside. The tool for trimming the outside is simply an open bolster. That is, take a piece of tool steel about one inch thick and five inches wide, bend it around the outside of the eye, causing the ends to fit nicely in the neck of the eye. The band should be slightly tapered to act as clearance. Now set this tool on the hammer die and lay the eye on top. A blow from the hammer will clean the eye completely. Now replace in stamping die with plenty of oil and water and with a few sharp blows finish the eye complete. The eye is now perfect in two heats.

The eye being complete, estimate the required stock for the pad as follows. A good size stock for this size of work is 2 by 3 inches. The size of the pad is 6 inches by 10 inches by $\frac{5}{8}$ of an inch thick, equaling 97.5 square inches required for the pad. Dividing this number by the cross section of the stock (3 by 2 equals 6 sq. in.), we have 37.5 divided by 6 or 16.25 square inches of 3-inch by 2-inch stock required to make the pad. No extra stock is left in this case, as the champer leaves ample material for filling out the die. The forging should now be cut off the bar as shown at G. A good heat is now taken on the pad end (keep the eye as cold as possible), the half-die already sitting on the hammer die, the hot piece is set in place, the dies snapped together with a pair of pick-up tongs and the clamp dropped on. A little spreader is then applied as shown at L. This tool starts the material at once. A thin, flat spreader about $1\frac{1}{2}$ by $\frac{1}{4}$-inch is applied endways, as shown in the end view at D. The whole mass is then crushed down with the hammer. The die is now turned upside down and placed on a small block, with a block on top. The dies are then tapped out of the clamp, the fins chipped off the pad, and we have in hand a perfect eye-pad completed in three heats without a weld crack and no anvil work to speak of.

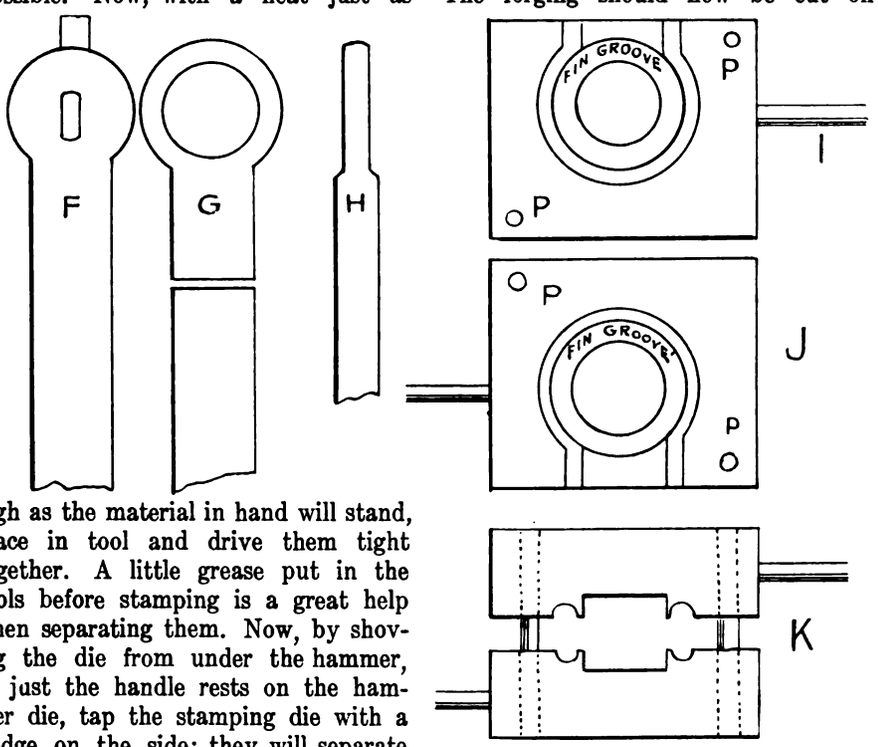


FIG. 2—THE EYE IS FORMED AND CUT IN TWO HEATS

The Principle of Case Hardening.

C. R. WILLIAMS.
Mec. Engineer Buffalo Forge Co.

While the art of case-hardening—hardening the outer layer of a steel or iron part—is comparatively new, the process is now thoroughly understood and results obtained are certain and uniform in character. The principle is that of the introduction of more carbon by a cementation process. Wrought and cast iron, machine and tool steel, may all be treated by this process; the tool steel must be of low carbon, however, to be affected by the process, as will afterward be shown. Copper, brass and other metals cannot be hardened by this process, and their close textures makes them as impervious to carbon as a duck's back to water. Practical use of this fact will be mentioned later.

There are two general methods of introducing the carbon into the surface of the steel. The first is the "Cyanide Process," in which the piece to be case-hardened is heated to a bright cherry-red, and powdered prussiate of potash is then sprinkled on. The chemical melts and the open pores of the metal absorb the carbon in the potash. The piece may be heated again and the process repeated if a greater depth of hardening is desired. It may then be allowed to cool and at any time thereafter be reheated and quenched to harden it, or it may be quenched from the case-hardening heat, in water (fresh or salt), oil, glycerine, or whatever combination of these the operator's experience has shown to be the best for any given piece, depending on the shape and size. Re-heating and quenching, rather than quenching from the case-hardening heat, will give a finer grain to the metal and be more satisfactory. The principle here is what has been determined experimentally, and that is that the grain is finer if the article be quenched from a rising temperature, rather than from a heat that is decreasing or cooling.

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The "Cyanide Process" lends itself to a reversal of the above with better results. For this the cyanide is melted in a large pot and the pieces are placed in it and "boiled" for from five minutes to a half-hour. The mixture generally used is half cyanide and half salt. By using this method of applying the cyanide to the piece, it is kept away from the air and no oxide can form on its surface and preclude the chances of getting handsome colors when the piece is quenched. It also serves to make sure that all parts of the piece have had equal treatment.

In the packing process, the articles to be hardened are packed in boxes of cast iron for small parts, and in boxes of boiler plate for the large sizes, with a mixture of granulated raw bone, charcoal, or leather scraps—and some firms mix a small quantity of cyanide of potash in the compound. The articles are packed so as to allow from one-half to three inches of the compound on all sides, according to the depth of hardness and length of firing desired. These boxes are then placed in a furnace and evenly heated for from two to 48 hours, depending on the condition wanted. For small parts, one-half hour firing will give a depth of one thirty-second of an inch. This process may be repeated any number of times, the pieces being surrounded with fresh compound, and the article hardened to a very considerable depth.

Parts carbonized by any of the described processes may then be heated once or twice, as if for annealing, and allowed to cool to distribute the carbon more evenly throughout the metal and secure a fine texture to the piece. It is said that wrought iron or machine steel handled in this way will show a fracture not unlike tool steel and in quality nearly as good.

In order to secure the handsome colors, which we are accustomed to see in some case-hardened work, the prime requisite is to keep the air away from the work throughout the process. If this is not done, a thin film of oxide forms on the surface of the metal and it is found that it is impossible to get brilliant color on it. Another thing which will hold in getting the mottled effect, is to apply the quenching bath in a spray or to quench the article in a bath which is being violently agitated with a stirrer or a blast of compressed air introduced beneath the surface of the water.

There are many quenching baths which are highly recommended by their users, but I will give only those which are in more common satisfactory use with a little discrimination as to their applications. Salt water quenches the quickest and most effectively, but by using oil the hardening is accomplished more gradually and with less liability of cracking the work. A mixture of glycerine and water is used for very delicate parts, which are especially liable to crack. The greater the proportion of the glycerine the more slowly will the piece be quenched.

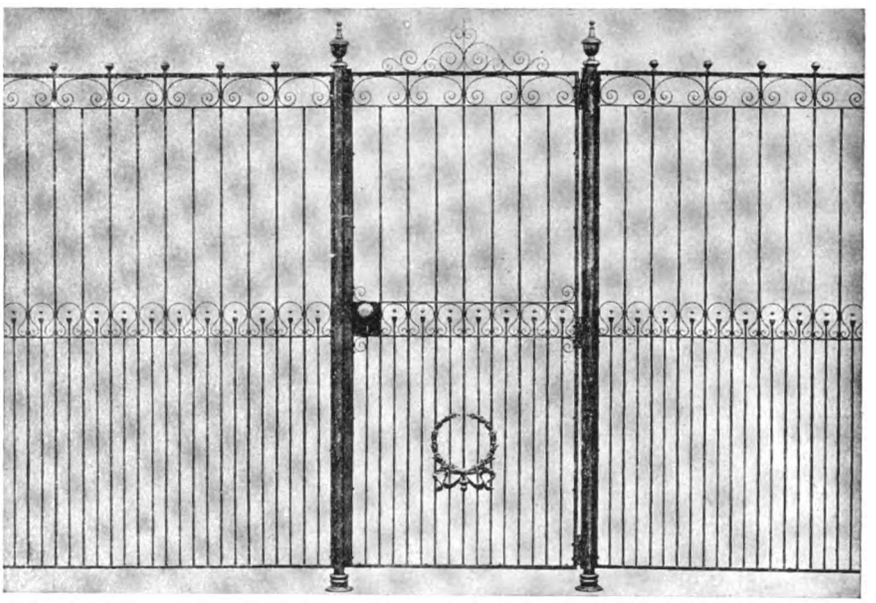
Sectional case-hardening or the case-hardening of only a portion of a surface or part is one of the tricks which can be done with the process. This is accomplished by packing the parts desired to be left soft with clay or spent compound. Or the surface may be case-hardened—not quenched—and then machined to remove the metal which has been affected by the process. If the article is to be hardened by the cyanide process, or where great accuracy is required, the surface to be hardened is japanned. The article is then placed in a nickel or copper plating bath and coated with a thin plating of the metal. It has been found that the plated surfaces will prevent the absorption of the carbon during the heating process.

A wide variety of cases might be cited to note the general application that case-hardening has. Dies and punches for sheet metal work, cams, plug and ring gauges, bicycles, sewing and typewriter machine parts, lathe spindles, ends of railroad rails, etc.

A very valuable feature of the case hardening process is that by surfacing the metal to be treated with an extremely hard jacket while the interior is comparatively soft, the article will effectually resist frictional wear and at the same time possess sufficient toughness.

An Ornamental Entrance Gate.

The ornamental entrance gate shown in the accompanying engraving is a product of the J. E. Bolles Iron and Wire Works of Detroit. The gate and fence, or grating, have a very plain appearance and yet they are very artistic and pleasing. The design is extremely simple and is made up of simple scrolls and straight bar work. The wreath on the gate may give the average iron-worker some little trouble in forging, but with this exception the entire piece can be easily duplicated.



PLAIN APPEARING BUT ARTISTIC AND PLEASING

Those of our readers who have followed the articles on ornamental iron-work that have appeared every month in these columns, must certainly have tried their hand at some of this work. Why not send a photograph for reproduction in these pages? A description of the work will also be interesting.

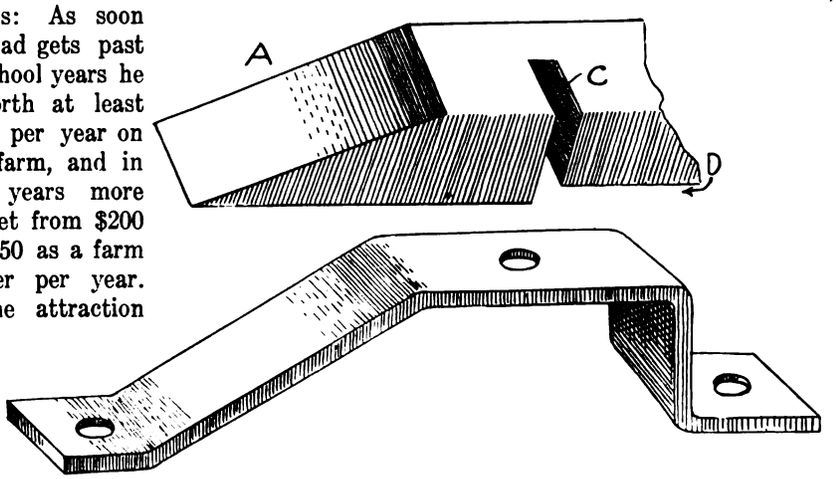
More on the Apprentice Question.

GEO. NABLO.

I read with much interest Mr. Breen's article in December, and would like to state some other reasons why apprentices are getting to be scarce in country shops. A traveler for a prominent hardware house told me that on his territory he found only five apprentices at work, where formerly every shop had one or two. Now, what Brother Breen says may be the case in some localities, but here his contention doesn't apply. The smiths

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are fine intelligent fellows, clean and sober, and have lots to do and are an honored class. But why are no apprentices found? The main reason is this: As soon as a lad gets past his school years he is worth at least $150 per year on the farm, and in two years more can get from $200 to $250 as a farm laborer per year. So the attraction in spending three years in apprenticeship, practically working for board and clothing, is not very alluring. Another drawback is the fact that blacksmithing is running more and more into horseshoeing and the boys don't relish that any too well. Another reason is that the work of a repair shop is so uncertain that one man can do the work for a large area, and tries to get along the best he can. I have trained a number of young men in former years and all are doing a good business, but in the last 15 years I had no application to take an apprentice, for the reason stated. I have four grown up sons. I gave them instruction in my art and they stayed with me until they could shift for themselves, but did they continue? Three of them are electricians getting 40 cents and over per hour, and one is employed in an automobile factory. When they visit the old homestead, they express sorrow that their father has to do such hard work. The same story can be said of all the older smiths. Not one of their sons would stay with the trade, and they are making good money in other pursuits. That is the reason why help in our business is so scarce. If help is absolutely required, we have to apply to the immigration department to get someone who is looking for a job and who, apart from being able to do driving in horseshoeing, is of little use for anything else. Such are the conditions here in the lake regions of Canada.



A SIMPLE TOOL WILL OFTEN SAVE MUCH TIME AND WORK

A Labor-Saving Tool.

C. W. METCALF.

If you have any bent work to do, I would advise you to make a tool with which to form your work, so it will be uniform. The tool shown at A is a very simple and easily made one. I had to make a barn track, and in forming the knees I was puzzled for a bit. But there was just one way out of it, so I made a form to bend them in, and I was able to make the four bends perfectly on one heat.

Take a piece of steel large enough, and cut a slot as at C and bevel the end to shape desired. Now cut down as at D the thickness of the iron. At B is shown the knee formed in this tool at one heat.

For handles this tool may be smaller. It took me about a half hour to make this tool, and it saved about three hours work, so you see good tools save time and time is money, and if you will take care of the cents the dollars will take care of themselves.

Diversified Business.

The Hope of the Country Jobbing Shop Painter.



M. C. HILLICK.*

The most practical message that in these early days of 1907 may be brought to the country jobbing shop painters, is that for the largest and most profitable development of their business, they must depend upon a system of diversified activities, just as the eastern farmer has proved that his success depends upon diversified farming. The time has gone by, if, indeed, it ever existed, when the jobbing painter, located outside of the goodly sized towns and cities, can command sufficient income from "sticking strictly to his last," as the cobbler might say. Necessity is the mother of invention, and there is no other alternative for the painter in rural communities, than that afforded by resort to other allied lines of work.

One of these alternatives, referred to in the *American Blacksmith* of earlier years, by the writer, is worth reiterating at this time. It is, in a word, connecting with the painting business the business of the vehicle dealer—buying carriages in the white, painting and finishing them, and selling as any dealer might sell. The writer has had knowledge of numerous painters situated in villages of anywhere from 500 to 1,500 people, who have, in connection with their vehicle painting business, built up a flourishing trade in new work painted to order. There is in every community a class of men who desire, before buying, to see the carriage or wagon in the white. They like, in short, to see the timber and to judge for themselves as to its quality. Usually this class of buyers is willing to pay an advance of a few dollars, at least, over that charged by the regular dealer in finished vehicles; and, in any event, it enables the painter to get a profit on his painting and finishing, in addition to the ordinary dealer's profit, all of which means growth to him at a time of possible idleness. It is not necessary, of course, that more than a sample job should be carried in stock, from which style, and other styles illustrated in the catalogue of the firm making the work, orders may be duplicated and examined, upon arrival, by the prospective buyers. As much is to be made some years, in some localities, in this side line, as in the painting business itself, and perhaps you, reader, are stationed in one of those localities. If your business, for any reason, is not what you find it ought to be, and you wish to improve it financially, why not venture into this new and promising field of work?

Perhaps a more diversified style of painting, a closer adherence to color selections and display of colors, as shown in the cities, will increase trade. Carriage owners in the country are to-day eager to display upon their vehicles the latest colors and arrangement of colors, and these people can

* Mr. M. C. Hillick was born at Ithaca, New York. He learned the trade of carriage painting here and worked for nearly nine years in the jobbing shop. Later he was employed in some of the leading factory shops of the state. For the past 14 years, he has been connected with the coach painting department of the Lehigh Valley railroad. Mr. Hillick is editor of the railway department of the Painter's Magazine, a regular contributor to many of the class publications, and nuthor of "Practical Carriage and Wagon Painting."

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in no way be more directly pleased than in furnishing them what the city drivers have. Study such styles, and in other ways aim to keep abreast of the most modern treatment of colors and their effects upon the finished vehicle.

As a rule, the country painter has held persistently to the practice of using lead and oil as the only available surfacer; whereas, it may be proved upon investigation that, under the conditions which he is compelled to work, some of the patent primers and surfacers are better and more economical—building up the surface quicker and at less expense. As a matter of fact, upon the low price basis governing carriage and wagon painting in the country, these ready-prepared patent surfacers often offer a way of escape from the threatened poverty of profits. They are furnished for both vehicle body and running parts.

The art of striping is far too frequently neglected among village and country painters. To be a good striper is an accomplishment within the reach of all. And yet you occasionally see the rural painter stenciling the stripes on the surface. This, in all charity, is a sorry and ineffectual way to meet competition. A fine, rapid liner is a money-maker, even beyond the reach of the city shop.

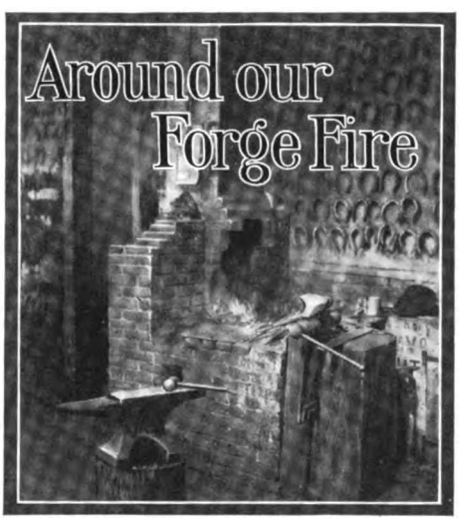
In this new year and in years to come, the painter readers of this publication, will find it to their interests to consider the automobile as a business factor. When the automobile fully adjusts itself to the industries of the country, as it is rapidly doing, the painter may expect to pick up some painting on this class of vehicles that will aid him materially. The farm wagon is another departure in diversified business which the painter removed from the clatter of the big towns cannot well afford to neglect. To be sure, the sources of revenue from this branch of work are limited, but the little drops of water make up the ocean's swell. The paints and other ingredients entering into the material used upon the farm and general utility wagon are cheap, and the cost of surfacing, etc., constitutes about as low an item of expense as one may hope to find.

Again, there is a class of people in every community who, under mistaken notions, or influenced by prejudices, elect to do their own painting, and yet choose to buy their stock of painting supplies from the painter, assuming, doubtless, that they may be sure of more reliable material. In some shops known to the writer, this line of trade has turned many an honest dollar to swell the margin of profits. Moreover, through this medium of barter, and the element of good-feeling created thereby, the painter has frequently secured work, at a good profit, which might otherwise have gone elsewhere.

How I Made Self-Sharpening Calks.

VULCAN.

Some years ago I was working in the West for a company for whom I had to shoe horses. That part of the business being foreign to my regular line, I found it difficult to keep the shoes sharp, until I adopted the following plan: When preparing the shoe I used iron calks, well sharpened. I then replaced the shoe in the fire, with a piece of cast iron that I could heat and handle easily; brought cast iron to the fusing point by the time the calk was at a white heat; then drew the cast iron over the outside of the calk and plunged it into the slake tub. The rest is easily told. The wrought iron would wear away, leaving the chilled cast iron sharp-edged. I have also used the same process for the bottom of plow shares.



"Mr. Editor! What is there to all this stuff you publish about side-lines?" asked Benton, settling himself comfortably in his usual seat.

"Well," returned the Editor, "in the first place, it isn't 'stuff.' It's pure matter-of-fact. There are lots and lots of communities that cannot support a straight blacksmith business, and it is there up to the smith to branch out until such time as he can do a sufficient large smithing business exclusively. For instance," and after taking a letter from his desk, the Editor continued, "here's a man in a small southern town. He's in about everything. His letter-head reads: 'Blacksmith and Wheelwright, Maker and Repairer of Farm Wagons, Carriage Painting, Horseshoeing, Furniture Repairing, Dealer in Kitchen and Dining Room Furniture, Maker of Picture Frames, Fancy and Family Groceries.' Now you may think that combination very funny, but if you were to visit that town you would find that all these various departments were well taken care of and that they were all needed. You'll usually find," continued the Editor, "that it's the big-hearted, public spirited village smith who sees a need for some line and he puts it in."

"That is alright; when a smith sees a need and can fill it without conflicting with his chosen trade, he would be foolish not to install the side-line," replied Benton. "But do you favor the installing of side-lines in every shop?"

"No; decidedly not," returned the Editor. "When a side-line interferes with a man's regular smith trade he should cut out the side-line. Any number of cases have come to my notice where the side-line is in the way. The smith is always doing something else when called upon to do a smithing job. As Thornton says, 'a side-line is to help out,' but it is not for the purpose of helping a smith out of his smithing trade. And that is what will happen if the side-line interferes with the main-line."

"What kind of side-lines do you particularly recommend?" asked the other.

"I strongly urge and encourage those lines which are closely related to smithing and vehicle work," replied the Editor. "Of course, if a smith has sufficient trade in certain lines to warrant the hiring of extra help to care for it, I see no objection to his taking this extra profit. Take Thornton's case, for instance; he has a big trade, has men to take care of what he calls his 'smith store' and he's continually adding more items. But the smith in the small village can't do this; so I say, stick as close to the smith trade as possible when taking up side issues."

"What do you think of a coal and wood business as a side-line?" queried Benton.

"It's alright if there's a call for it. But you will generally find that the average farmer has a wood lot. The need governs the line every time."

Joyce came in at this point and addressing Benton, said: "Been looking for you. I've got on old job of repainting and want to remove the old hard paint. Can you tell me what to use?"

But Benton already had his recipe book in hand and read in his usual sing-song: 'To remove old hard paint: In a quart and a pint of water dissolve one pound of potash and heat the mixture. Then add enough dry ochre to make the compound about the consistency of rough stuff. Now spread it on the paint, allow to remain till paint is soft; then remove."

"Where'll I get the potash, and what kind of stuff is it?" queried Joyce.

"You can buy it at the drug store or of your grocer in cans."

With a hearty "Thank you," Joyce went out to do his job of paint removing.

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The Blacksmith.

MRS. W. B. NEWTON.

You may talk about professions
Of every kind and grade;
But where, my brother, tell me
Will you find a nobler trade,
One that helps the friend and neighbor,
And strives as best he can
To do a faithful, honest work
More than The Blacksmith-man?

The blacksmith's shop stands open wide
To serve the public far and near.
In summer's heat and winter's cold
You find the blacksmith here.
He strikes the first decisive blow
That severs the iron band.
The weld of iron and edge of steel
Are works of his own hand.

The preacher's buggy needs repair;
The doctor's horse calls for a shoe;
The teamster's wagon wants a tire;
The farmer's binder's broken, too.
All sorts of rigs he fixes up,
And horses with feet crook'd and straight,
By use of mind as well as hand
He will suitable shoes for each create.

Do you ever give him a word of praise?
Though often by night, as well as by day,
By the light of his lamp he shoes your horse,
And, perhaps, sometime gets his pay.
The blacksmith is no perfect man,
Has faults as well as you,
But the world will be a better place
When the blacksmith gets his due.

Written expressly for THE AMERICAN BLACKSMITH.



Integrity is the life of trade.

Bad debts—how many of your dollars are charged here?

Many smiths in your neighborhood? Are you taking the lead?

Compare this issue with that of a year ago. Any suggestions?

It's not what we want to do so much as what we do that counts.

A Missouri smith runs a roller rink in connection with his shop.

Often we fool ourselves alone when we think we are fooling others.

'Tis always interesting to refer to. But, do you keep a record of your shop work?

Take off your coat if anyone is hanging on to the tails of it—you'll find it easier going.

Some brother is just waiting to answer that bothersome question of yours. Send it in.

Have the shorter days of winter brought a proportionate decrease of work? Do you know why?

Like a man, an engine will last longer and do better work if not worked to the limit of capacity.

Takes a little time, but 'tis well worth the effort. And when a shop's clean, people enjoy coming in.

Figure it out yourself and see if a new tool won't pay better than a constant repairing of that old one.

Some men imagine they have been hustling when they have only been driven out of other people's way.

"I'm taking care of the dimes," said Tom, as we found him mending his old bellows for at least the hundreth time.

'Tis said that in every mile of railroad there are seven feet, four inches not covered by rail—this is left for expansion.

Are you doing work just as your grandfather did it? He didn't have the advantages of modern tools and machines.

'Tis a mistake to grow old—keep your mind active and your hand on the wheel. Don't be classed as a "back number."

No woodworker is now located at North Bay, Ontario. Mr. John Connelly will give interested parties further information.

A good smith is one who cares for his tools by getting the best in the first place, and then keeping them right up to date.

Make your competitor hump for business by putting a good, big measure of energy into your own, rather than knock his work.

Remember your fellow craftsmen when you get a new idea. Our columns are always open for good things along this line.

That box of sand in the engine room? Better place it there before it's too late. It's best for extinguishing burning gasoline.

Know it all? Of course not—a man may keep on learning about a given subject, even if he knows more about it than anyone else.

A first-class smith and woodworker is needed at Meltonville, Iowa. Those interested can address Mr. E. A. Back. of that place.

Experience may be long without being broad. 'Tis broad experience that counts. A half century at the anvil may mean little or much.

Loser in every way is the cutter of prices. Consider your neighbor smiths when tempted to lower prices, and do unto the neighbor as if you were the neighbor.

'Twill save much time and trouble to know all about your tools. Study the construction of your power hammer, gas engine and other machines.

Push or be pushed, seems to be the slogan of today's business world. Ever think how you can use a good big stick of advertising to push your business? Try it.

Improved machinery takes much of the drudgery out of the trade. Not necessary to toil like a slave over your work when proper tools are what you want.

'Tis said that three Smiths in Michigan aspire to the United States senatorship. They should jointly be able to forge a good luck horseshoe for one of themselves.

Ask today for plans. An association in your county will secure almost every reform necessary to make the craft more congenial. It will cost but a postal and the slight effort—but, do it now.

A St. Louis smith killed another man with a single blow of his fist. A blacksmith should be very careful about hitting anybody, and, incidentally, everybody should be very careful about getting hit by a blacksmith.

Do you sit down and think about it, start in and experiment, or do nothing at all when meeting an emergency? Best to have the tools and material always ready; then, when an extraordinary job comes in, get at it with determination.

Independence, to a certain degree, is commendable, but there is no call for a balky horse. It's the pulling together that brings results—organization will secure better prices, needed reforms and place the craft on a footing with other professions.

Some horses seem to know more than some owners, as is shown by a Newark butcher's horse going to the blacksmith's on his own hook. He stood about the shop until attended to and then went back home. He had slipped a shoe, but wasn't inclined to await the pleasure of his owner.

Food for thought: If cost of supplies go up, and the price you get for work stands still, then your profits go down. Get a back-bone. Ask more for your work. Against the price-cutting competitor you can use the argument that your work is better. But, get a better price.

The wheel-painting machine is a very unique contrivance, saving much time, and painting the wheels with much better satisfaction than can be done by hand. The receptacle for holding the paint is a large round pan about the size of an ordinary wheel. The wheel is immersed in about four inches of paint, just enough to cover it, and, after a second or two, is brought up near the top of the pan by means of a lever. It is then set on an axis, and revolved at a rapid rate, throwing the superfluous paint on the sides of the pan. Different pans are used for different colors of paint, and anything from priming to color varnish and finishing varnish, can be put on by this method. The rate of rotation of the wheel is according to the kind of material being put on. It paints wheels rapidly, and is probably one of the greatest time-saving devices in the manufacturing of carriages. By this method, 60 sets of wheels can be put through one operation inside of an hour. It puts the material on much more satisfactorily, and does away with the handling of the wheels in painting, in which operation more or less finger marks are left on the wheels. The wheel is left smoother,

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and no paint brush bristles are left on them. It does the work entirely satisfactorily, and saves lots of time.

Of Vital Importance!

If you read The American Blacksmith, or any other periodical, you should protest against this proposed law.

The attention of every American Blacksmith friend and reader is directed to this article. Give heed if you at all value the practical information you find each month in these columns.

A joint postal commission appointed by Congress has recommended a law which, if passed, will restrict and damage almost every periodical published in this country, and unquestionably result in great detriment to the reading public. It is proposed, for example, that periodicals be not permitted to print a greater number of advertising pages than reading pages. Now, as everyone knows, it is only the revenue received from advertising which makes possible low subscription rates. Therefore, the proposed law, if it did not crowd the majority of good papers out of business entirely, would require a big advance in the subscription price, in order for the paper to live.

There are a number of other provisions in the report equally harmful to all publishing interests, and which are radically opposed to the policy of our government up to this time in encouraging low priced literature for disseminating valuable information for the advancement of civilization.

The only apparent reason for this action is a deficit in the United States Post Office Department. But, if the government paid postage on its own mail, now sent free, there would be a surplus, not a deficit. Within the last few years periodical mail has doubled, while the deficit has decreased; whereas, if the periodical mail were responsible for the deficit, it would have been materially increased in that time.

To our friends and readers we appeal for action in fighting this measure. If you value The American Blacksmith and the information it affords you, and if you do not want a law which might oblige us to raise our subscription price to possibly five dollars or more per year, then please consider this a personal matter and write a letter at once, this very day, to your representatives in Congress, urging them to vote against this measure. These men were put in Congress to do your bidding. They are there to make laws that you want—laws that will benefit you. Therefore, don't hesitate to write your representatives immediately to vote against this harmful measure. This bill will be discussed and voted on in a few days. There is no time to lose. Write to your representative and to your senators at Washington, D. C., vigorously protesting against any change in the laws relating to second-class periodicals, and especially against any restriction of the amount of allowable advertising.

Write at once. Write TODAY.

Readers and Non-Readers of Trade Literature.

A member of the craft wishing to take a vacation from the anvil, went "on the road" a few months for the manufacturer of a device which proved to be quite new to the smiths of the western states. In writing of his experiences and observations he says he found that trade journal readers were most interested in what he offered. "But," he continued, "the class who do not read a journal treating on their craft do not seem to be interested in anything new. They prefer to plod along in the same old rut, and then they wonder how their competitor can turn out so much work in so short a time."

It has always been acknowledged as a fact among business houses everywhere, that the man interested enough to read journals dealing with his trade, is also interested in anything new, or that which is likely to make his work better or easier, or enable him to turn it out quicker. The reader of papers devoted to his craft is not likely to be caught napping by his competitor. But the man who "hasn't time" to read his trade papers, usually hasn't time for anything. He hasn't time to study his competitor's methods and profit by them. He finds no time to solicit trade, clean shop, send out bills or do any of the hundred and one other important things necessary to a successful business. He practically acknowledges being uninterested in his craft when he refuses to read some trade journal or to read good practical books.

American Association of Blacksmiths and Horseshoers.

The past month has seen the starting of associations in the following states: North Carolina, Nebraska, Alabama, Iowa and Georgia. One of the Georgia branches known as the Chatham County Branch, is already in a good flourishing condition, and I hope to report favorably for the others at an early date.

It is, indeed, gratifying to find one's work so full of results, especially when such efforts have been along the line of craft uplift. There is nothing that I know of which will place the good old craft in its rightful place among the professions as organization, and I want every reader of these columns to ask my aid if there is no branch association in his county. The foundations for the branches referred to above were all postal cards of inquiry. Why can't you do the same? Just ask for my help and I can almost guarantee your becoming as enthusiastic as I am about organization. Almost without exception, every smith, upon receiving my easy plans, is very anxious and willing to go about the founding and formation of an association. The work is so easy that the matter of better prices, protection and harmony seem but a step away. Mr. Reader, consider this a personal appeal for a postal from you. It will take but a minute and if left until some other time, you may forget. Do it right now, while the matter is fresh in your mind. You don't even need pen and ink, if you have a pencil in your pocket. Will I hear from you today? Address American Association of Blacksmiths and Horseshoers, P. O. Box 974, Buffalo, N. Y.

THE SECRETARY.

The Experience of an Iowa Smith.

O. L. STEVENS.

(Prize Contest.)

I wish to tell my brothers of my experience in running a blacksmith and wagon-making shop in a rural district. I have been located here for eight years—a town of about seventy-five inhabitants, and two miles from the county seat, where there have been from three to five shops. I commenced to run what I called a good shop. Much of the time I was out of material and, consequently, lost a great deal of work by not having stock on hand. So I just made a little more than a living. There are many smiths in the same condition. I did not think it paid to keep a stock, and then, again, I didn't know what the craft was doing, for I took no trade journal. I was a back number—in a rut, and still I thought I was doing the best I could, and so kept on in this way until about two years ago. I used the old-fashion screw-plates, and often said it would not pay to buy an up-to-date screw-plate for the work I had to do. If some one had stolen the old ones, it would have been a good thing for me—but not so well for the other fellow. I have now been taking "Our Journal" for the last two years, and could not do without it.

My eyes were opened, and I began trying to get out of the rut. The first thing I did was to get a Little Giant screw plate. Then I commenced to increase my stock. In the fall I found I needed more shop room, so I bought material and built another room; and then I concluded to put in power. I bought a Challenge gasoline engine. Many said, "Do you think it will pay?" I replied that I did, or I would not have invested my good money. I then bought a band saw, an emery stand and a 2 by 12-inch emery wheel, for general work. A buffer, a 3 by 8-inch emery wheel for

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grinding sickles, a tenon and boring machine then followed, and for the first season I use my old drill. That was in 1905. My work increased, also my stock of materials, and I met all my bills on time, or made everything satisfactory till I could pay. In September I had a stroke of paralysis—my lower limbs would not carry me. I went on crutches for several weeks, had to close my shop, and supposed I was done, as far as work was concerned. But I recovered, and commenced work again while still on crutches, and kept improving.

I then began preparing for spring work by repairing my tools and placing orders for new ones. I built a nice steel forge and bought a Royal blower, also a No. 14 Western Chief drill, Then I got a combined punch and shear. It cuts off 4 by ½-inch and punches ⅝ to ½-inch holes. I then bought a Reynolds tire bolter and, later, a Prentiss vice. I had a good line of tools before, so that I now have and run an up-to-date shop, the best equipped in the county. My work is all repair work for farmers, and I have much plow work. When I make a plow-share and weld the bar on, I guarantee the bar to be welded so you cannot see the weld. And I always weld them clear to the top. I have about $1,100 in tools and material, and keep almost everything that the farmers need. My trade has more than doubled what it was before putting in power and I am expecting it to increase much more. The expense of running the engine and machinery amounts to very little. I can run my engine a year, as I need it, for what I can hire a man a week. Putting in power is one of the best investments a man can make in the blacksmith and wagon shop.

Another thing I wish to mention is, keeping a neat shop, the tools in their places and in shape, so as to be ready for work any time it may come. A clean shop speaks for the owner. Don't let the scraps accumulate around the anvil so you can't get to it, there are other places usually more convenient for the scrap.

Handling Buggy Work.

J. F. M'COY.

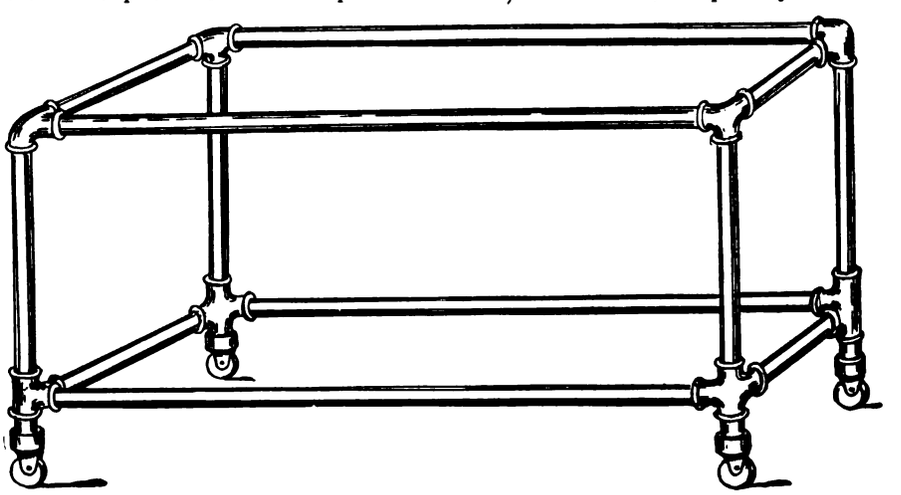
I swing all of my work with a crane. I draw my wagon under the crane, lower the rope to the body and make fast to the four shackle-irons. I then draw tight on the rope. I now take the nuts off, and the body is easily lifted from the gear. It is then pulled up with the rope and swung on where I have a truck made of gas pipe, 20 inches wide, 4 feet long and 2 feet high, with trundles under all four legs. The trundles are about 2½ inches high. After lowering the body onto the truck, I roll it where I want it. These trucks are very handy for burning off bodies, also for painting, rubbing and finishing, as you can turn your work to the light without getting off your seat. One man can do all this work alone and without soiling body or gear. I think the crane is much better than the bridge, as it takes up no room inside or out, and you can handle the fresh finished work without soiling it.

I have three of those trucks in my shop and I think they are the best tools I have. One of them is six inches high for trimming bodies. They can be made by any gasfitter at a reasonable price. I would not take $10 apiece for mine if I could not get another.

How to Repair a Broken Auger.

J HANAN.

The auger to be repaired has the screw broken off. Dress the stub of the screw to a level with the bit. Then file the place for the screw to a sharp edge. Now take a piece of steel ¼ by ¼ and about one inch long and split one end about ½ inch deep. Then draw the two pieces of the split end flat and sharpen and straddle them over the sharpened place on the auger, and tap it down till it sets firmly against the sharpened place in the exact center of the auger. Now turn the two legs of the plug-screw so as to fit closely in the twist of the auger. Make them fit nicely, and then hold that part of the auger in the fire till it is hot enough to melt borax. Now take a piece of good brazing metal and lap it over the stub screw so as to come over the legs of it; put on borax and return it to the fire, turning it so as to keep the bits of the auger as cool as possible. The auger is now taken from the fire and the bits dipped in water, taking care not to cool the center Now replace in the fire and proceed till the brazing melts. Then withdraw the auger from the fire and turn it so as to run the brazing all about the stub, where it touches the auger. As soon as it is cooled sufficiently, dip the auger so as to temper the bits. Now, with a round file, dress the legs in the twist of the auger so as to smooth them. Then file down to roundness and to the shape of a screw. Now, with a small taper file, cut the threads for the screw, beginning at the intersection of the bits at side of screw, thus making two lines of thread—one for each bit. If well done, many a valuable auger may be made good in less time than it takes me to write about it.



AN EASILY MADE CONTRIVANCE FOR HANDLING BUGGY BODIES

A Talk on Piecework.

BY OLD TIMER.

Several articles have appeared in "Our Journal" relating to piecework. For over 43 years I have been a foreman, and still hold the same position. I have done piecework in my time and made 50% more than by day work. Now, suppose we employ a smith at 35 cents per hour and a helper at 25 cents, or a total of $5.75 per day for both. Suppose the two were to make ten pieces for a day's work. This would make the cost $.57½ for one and $5.75 for ten. Adding for capital invested, taxes, wages for managers, foreman, clerks and other expenses, or about 25%, will make the cost on ten pieces $7.20. The cost of making 15 pieces would be $10.08, thus resulting in a saving of $6.28 on every 100 pieces. But what is the general result. The first thing that takes place is a cut of 25%. The foolish

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workman will then pitch in and work still harder till another cut comes and, at last, he has to double the amount of work he did when working by the day. Unfortunately the workman doesn't take into consideration his strength. How long will he endure it, and have his proper usefulness? Statistics demonstrate that where a smith has served his apprenticeship, and then starts on piecework, his useful days are shortened to 45 years. Now then, what is the need to shorten one's days of usefulness by overdoing oneself and to be worn out at 45. Do a fair and honorable day's work, live as long as possible, and there can be no reason to complain.

In closing, I wish some of the readers would answer this question: Who is the gainer on piecework, the smith or the firm he is working for?



FIG. 1—SIMPLE FORGE WORK IS GIVEN THE ENTERING STUDENT

Thornton's Letters.—4.

Being "Straight-from-the-shoulder" Talk from a Prosperous Self-made Smith to his Former Apprentice now in Business.

Dear Jim:—I've been waiting for your letter of the 25th. I knew it would come. Every young smith runs up against the same thing, and his future depends on whether it floors him, or he gets a strangle hold on it. You've got to make a careful study of each particular case to make a success of shoeing. If you have continued to carefully study your dissected foot and leg, as I told you to before you went away, you'll have no serious trouble. But you want to be observing. You cannot be star-gazing when you are working on a foot. You've got to pay attention to every point and part of that foot, and nothing else. Read your craft papers. They are a part of the business that you cannot afford to neglect. They not only keep you posted on the news of the blacksmith world, but they instruct and at the same time entertain you. If it were not for these craft journals, where would the smithing trade be today? Now don't say you haven't time. It's like the business man who says he hasn't time to take care of his health. And, Jim, if you think the nightly romp with the boys is worth more to you than a good knowledge of your trade, you'd better quit right here.

Don't fly off the handle, Jim; I am simply mentioning these things by the way. I really don't believe it necessary, but it's better to say them now than when they are the only things to say.

While we're on this subject of horseshoeing, let me remind you that every dog has his day, and there are days for the horses, too, and it's the duty of the honest horseshoer to prolong those days as much as possible. You will find a lot of stuff in the craft papers, about doing this or that and not doing a good many more things. You may think that this is all bosh, but take it from me that it is the stuff to remember. There are, of course, the proverbial thousand and one ways of shoeing horses, and there are also a thousand and one kinds of horses to be shod. Make a study of each special case. If you lived a thousand years you wouldn't know all there is to the business, and the only way I've found in my years of experience, is to take a good practical craft journal or two; read them diligently and study them continually.

In closing, let me remind you about your prices. Don't cut, whatever else you do. Keep up the standard of the smiths in your town, and if possible a little above this. Of course, a little higher price means a better class of work. But don't fear on that score: You can turn it out O. K. if you want to.

Yours, Thornton

A Course in Forging at an Agricultural College.

Joseph Jensen, Prof. Mechanical Engineering, Director of Mechanic Arts.

The courses of manual training in mechanic arts in the Agricultural College of Utah are unique both in the scope and grade of work done. It is a local institution and takes into account local conditions. It has less of pedagogy and more of plain facts than some other manual training schools. It has less fancy work and more solid, substantial construction than some others. It draws its students almost exclusively from the country and that, too, from a country which still contains traces of frontier conditions. The largeness of the range has left its inevitable effect upon its children. Energetic, ready and willing to get things done in a hurry, but inaccurate and even slovenly, with but small regard for symmetrical proportion, etc. These are the qualities of the young men who enter this school for instruction in mechanic arts. Many over eighteen years of age have not finished the curriculum of the primary schools, and have given up all thought of doing any more school work. They come for "Shop Work;" but, to get shop work they must register in the regular course, and thus they get English

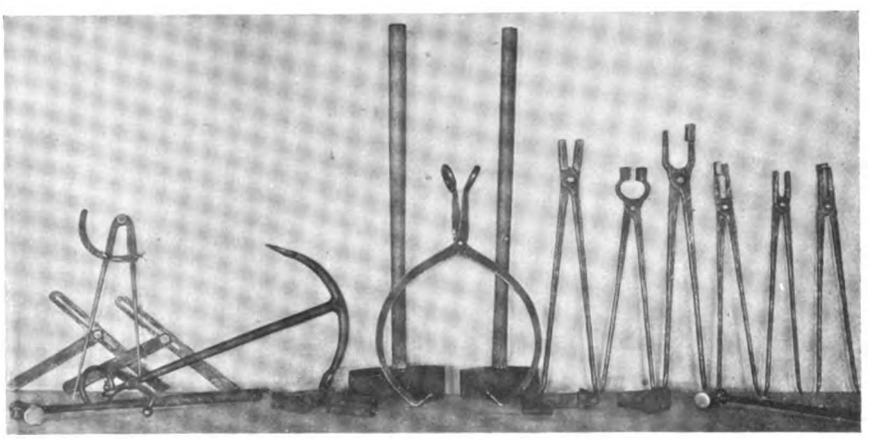


FIG. 2—THE WORK IS OF A MORE PRACTICAL NATURE DURING THE SECOND AND THIRD YEARS

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mathematics, drawing, history, elementary science, etc. Four hours per day instruction in these studies and three hours in the shop is the regular program.

In the shop work, what has come to be known as the "Laboratory Method" is followed. That is, the object of the exercise is "the learning how to do it," while the value of the product is partly, or it may be wholly, lost sight of. Originality in design, or the making of things selected by the individual, according to whim or fancy, are kept well in the back ground until a foundation for such work has been carefully laid. The first exercises are purposely selected without reference to any value that the article may have after the exercise has been completed. The idea is to perform certain operations in certain definite order and obtain a certain definite result, and not to make an article to serve some general or definite purpose. These exercises are simplified to a single idea in addition to those which have preceded. In Fig. 1 are shown ten such exercises, showing the operations by steps. These particular exercises are not the first ten nor are they consecutive, but are selected at random from the exercises of the first term's work in forging. Some result in an article of apparent usefulness, others, though they may be perfect in grade, have served the purpose of their creation when the operations by which they came into existence are finished. All exercises, the useless ones quite as much as the useful ones, have left with the student one new idea in forging, which has been so timed as to easily correlate with those that have preceded. It has left his hand with additional skill, not only by repetition of something that it has done before, but by having added thereto one single, simple element. It has given the eye an additional exercise in proportion. It has given the student new confidence, because he has done something which he never did before, and he has a result which is exactly what he started out to make, as detailed in the scale drawing from which he has to work.

The first year's work is necessarily class work. The second and third years' work may be largely individual work or group work. The elementary principles have been mastered; they are now given an opportunity to apply them in simple construction. In Fig. 2 are shown samples of this grade of work. The student is never permitted to work with the idea that he is to make a pair of ice tongs, for instance, that will serve the purpose, but that he is making something according to certain specifications and that certain principles must be observed both in operation and result. Accuracy is a primary consideration always, and in the course of time, varying with the characteristics of the individuals, he learns that to do things right and accurately not only does not involve extra time, but is a saving of time.

This is emphasized after the first year by requiring each student to fill out a blank at the close of each day's work, showing what article had occupied his time, exactly what progress has been made and how much time had been expended. Then, by fixing a rate per hour, he gets a pretty good idea of about what he is worth as a mechanic. During the fourth year, the student is allowed to plan his own work, make his own design, calculate his material, estimate the time required, and arrange the details of his work. This work may also be done jointly by two or, occasionally, more students, or by a single individual. Upon the success of his plans and their execution depends his graduation. In Figs. 3 and 4 are shown examples of this class of work.

The success of this system no longer requires vindication. The interest in the work among the students is of the keenest type, no "driving" is required, except to leave the shop at the end of the period. The success of those leaving the school is all that could be desired. Indeed, it is a little disappointing to have "good men" in their second or third year accept good positions as mechanics before having completed their work. Many accept positions with contractors to do repair work of various kinds, after having finished only the first year of their course.

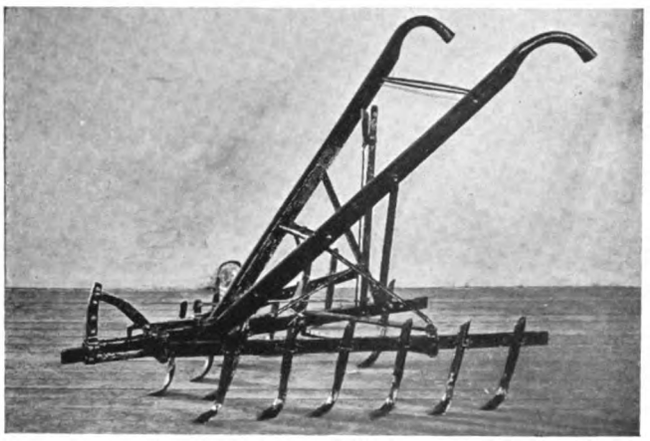


FIG. 3—THE STUDENT IS ALLOWED TO PLAN HIS OWN WORK DURING THE FOURTH YEAR



FIG. 4—BUCKBOARD BUILT BY STUDENTS—TEAM DRIVEN BY ONE OF THE INSTRUCTORS

From Blacksmith to Manufacturer and Fortune.

A: W. BURCH.

(In Profitable Advertising.)

Twenty years ago a careful examination of the map of South Carolina would have revealed a tiny black dot crowded close up against the northern border, and marked in very small type—Rock Hill. It is a city now and its name is spelled in larger type, but in those days it was a straggling village, sleeping under the depression that covered all the South and gave no promise of future greatness.

About that time, by a combination of circumstances which are immaterial, the village blacksmith shop became the property of J. A. Anderson, the present owner of the Rock Hill Buggy Company. The plant consisted of about $15 worth of tools, including a few simple implements for repairing the wagons and ox carts of the farmers on the surrounding plantations.

Mr. Anderson looked over his new possessions dubiously. Up to that

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time he had worked in a printing office, and the things he did not know about running a blacksmith shop were many. If he had possessed greater knowledge of the business, and the cost of transportation had been less, he might have sought a more promising field. He had, however, a mighty incentive to hustle just at that time, for there was an immediate and urgent need of bread and bacon in the Anderson household. So he hired a negro blacksmith, got into his overalls, and the next day was industriously working with handsaw and spoke shave.

His earlier work may have lacked somewhat of beauty, but it was substantial and durable. It pleased his customers, and the business grew. Finally he was able to hire an extra man, and then another. Then came a dull time, and to keep the men busy he decided to build a buggy. When finished, it sold readily, and he built more. He did not know enough about the business to make a poor buggy look good, so he just built good buggies. Orders came more frequently, and he hired more men to keep up with them. Business ran smoothly, and the bread and bacon problem became less difficult of solution.

One day a representative of *The Christian Advocate* called at the shop, and, after a long conference, went away with an advertising contract in his pocket, by the terms of which Mr. Anderson agreed to pay the sum of $10 for a one-inch advertisement to appear in every issue of that publication for a period of three months.

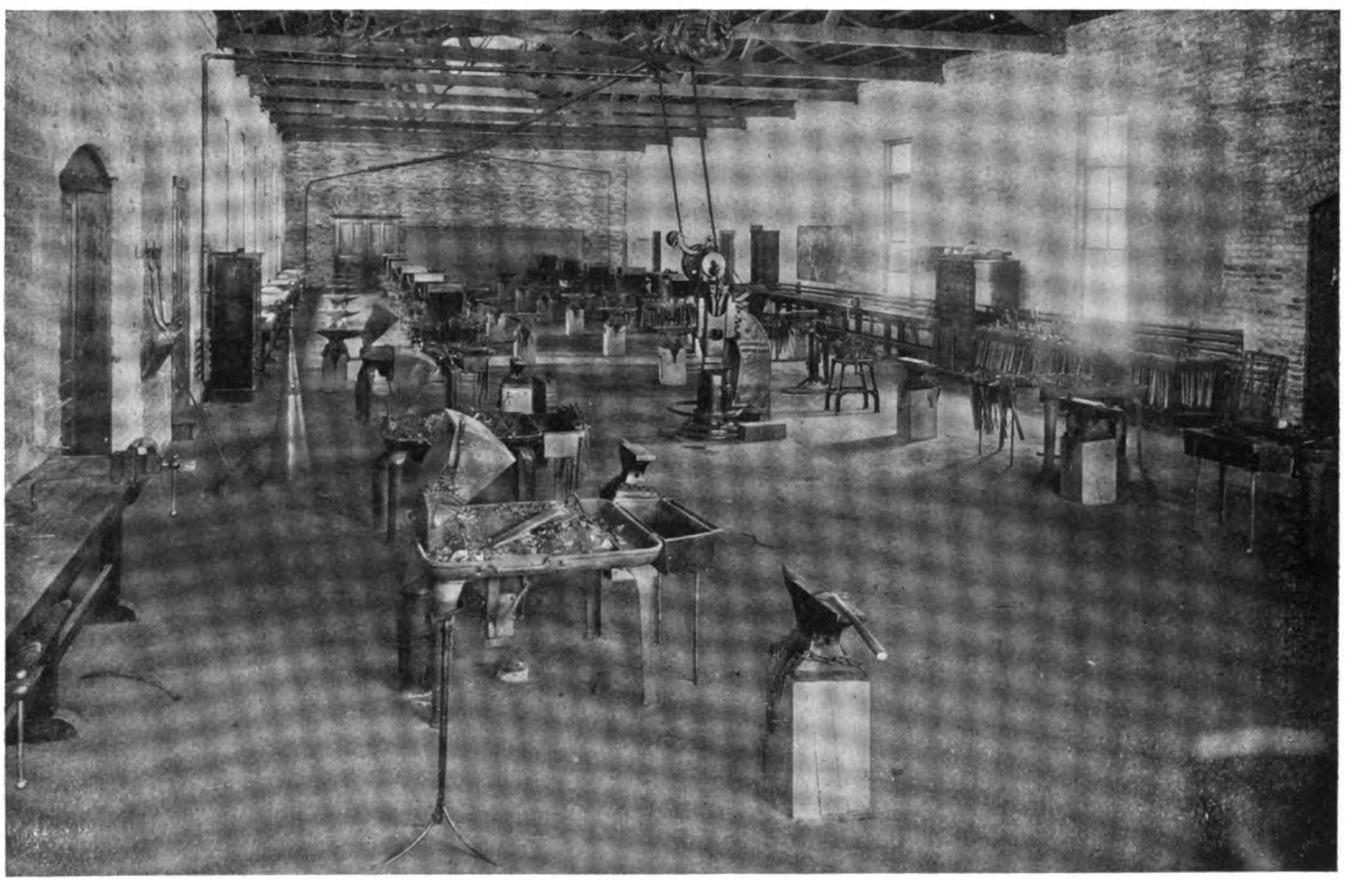
The following week the advertisement appeared and brought an inquiry from a man in an adjoining state. Mr. Anderson was not prepared at that time to do business at long range by modern methods, and the request for an illustrated catalog jarred him momentarily. Had he been a less resourceful man, this story would end right here, but from the day away back in his history when he borrowed $12 to meet a $16 payroll, paid $10 to one man and then borrowed $4 from him to help pay off the other, he has found a way of meeting such business and financial problems as have confronted him. So he went to a neighbor, whom he knew had recently received a catalog from a carriage manufacturer, begged the book, cut from it an illustration that closely resembled the buggies he was making, sent it, with a forceful letter, to his prospective customer, and got his order.

Other inquiries and sales followed so rapidly as to sorely tax the capacity of the little shop.

"After this small experiment in advertising," says Mr. Anderson, "I was quick to see that my field of operation was limited only by my ability to make buggies and increase my advertising. Accordingly, I began to lay plans for increasing my output, and as soon as I got far enough along in such preparation I placed my advertisement, which occupied one inch, single column, in forty papers."

"In a short time orders began to come in a manner that was appalling to me, and I worked day and night studying business methods and systems, that I might keep up with the growth of my business. As my sales and the capacity of my factory increased I advertised in more papers, always with satisfactory results; and I may say right now that whatever success the Rock Hill Company has achieved is due directly to printers' ink."

"Through all the busy years that followed, with changing style and modern method, I have clung to one old-fashioned feature—honest quality.



THE FORGE ROOM OF THE AGRICULTURAL COLLEGE OF UTAH IS THOROUGHLY UP TO DATE—SMOKELESS, PLENTY OF LIGHT AND A GOOD EQUIPMENT

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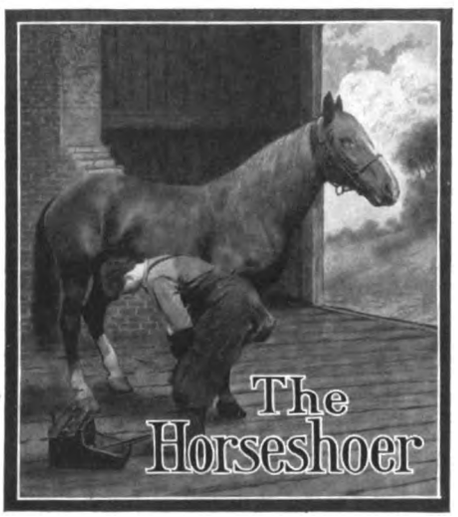
I have never tried to make more buggies than I could make well, and every buggy that ever left my factory was as good as I knew how to make it."

A BUGGY FOR $10

less than you can buy the same Buggy for elsewhere. I will send you a HAND-MADE vehicle that will run well, stand well and look well. Get my catalog at once. Reference, W. D. Kirkland, editor *Southern Christian Advocate.*

J. A. ANDERSON,
Rock Hill, S. C.

"After establishing a satisfactory reputation and demand for my vehicles among users, so many orders came from dealers all over the country that I discontinued my original plan of selling at retail, and during the past five years have manufactured exclusively for the trade. My factory now turns out 30 buggies a day, and from the time of my first advertising, its capacity has been taxed by orders."



A good hoof ointment may be made as follows: Take four ounces each of mutton tallow, resin, pine tar, fish oil and beeswax; mix well together and apply at night. H. O. G.

When shoeing a mule with calked shoes have the calks as low as possible. Keep the foot close to the ground and see that all calks are of an even height. See that the shoes fit the foot and wall, and use small nails. The nail holes should be straight punched. A. H. S.

Don't rasp under the clinches—has been drummed to the horseshoer so often that one would think they all knew it. But I ran across several men during the past week who, on being questioned upon what they were doing, said they didn't know it did any harm. But it does, Mr. Horseshoer. Better use a little chisel, and chip out the little nib of horn under each clinch. 'Twill be more workmanlike, and may, perhaps, be the means of lengthening the usefulness of the animal. Paste this little item on your rasp if you can't remember, but don't rasp under the clinches. A SALESMAN.

A Talk on Horseshoeing.

W. B. NEWTON.

I do not mean to be egotistical or to give the impression that I think that I am the only capable blacksmith, but for several years I have found my method of shoeing successful and many horse-owners having animals with complicated feet, have brought them to me, (often a distance of many miles).

When a horse of any kind is brought to the shop to be shod, the first thing I do, after removing the old shoes and thoroughly cleaning the foot, is to step behind the horse and with a "careful eye" line up the foot and leg. I take in the outline, noting any curves, outgrowths or depression that may be on the foot. The horse's foot varies in form and shape as well as the human foot, and in order to have a well-fitting, easy, comfortable shoe, the outline of the foot must be considered, whether it be on man or beast. It is just as reasonable to suppose that I can wear my neighbor's shoe with comfort as to think that one horseshoe will fit every horse's foot. I sympathize greatly with the horse, the animal that bears so many of our burdens, responds so readily to our call, and in various ways facilitates the work of man in the warfare of life. I am heartily in favor of humane treatment of that magnificent animal; and what would more alleviate his suffering feet and limbs, during his long, tiresome journeys than a proper adjustment of his shoes. But, pardon my digression, to resume the subject of fitting the shoe—If the foot is regular and even in outline it is very easy to fit an ordinary shoe thereon. But if the outside of the foot has greater growth than the inside, I fit the shoe to the inside and, if possible, pare off enough from the outside to make the foot evenly balance with the leg. If this cannot be done without injury to the foot, I raise the inside calk enough to place the heel on a level and weld a small piece of iron onto the shoe, between the first and second nail holes at the toe. This will bring the toe up to a level with the heel. I have found that a shoe fitted in this manner is a very good shoe to prevent interfering. My method of paring a horse's foot is, to pare off only the surplus wall which has grown down. Never pare the sole of the foot, or cut out the quarter brace, as this injures the foot.

By dissecting a horse's foot it will be found that, on the average foot, the outer or horny sole is about three-eighths of an inch thick; the inner or sensitive sole is one-eighth of an inch, and then comes the hoof bone. It can thus be readily seen that there is not very much protection for the bottom of the foot. If this sole is pared away it is often the indirect cause of contracted feet. Many a horse's lameness is caused by too thin a sole, when the disease is thought to be some place else. By packing the foot and covering with a sole leather pad the horse will often find relief. This method of packing is often beneficial for horses having corns. I never pare a corn out, as the more you pare them the harder they become. Corns are often caused by paring the wall of the heel too close, thus making too much pressure on the sole. The shoe should never press against the sole.

Calked Shoes Versus Plates.

S. H. GRIMMETT.

In the December number, an Eastern brother claims that a horse or mule can pull just as well with plates as calked shoes. It may be that Eastern horses and mules don't have to get down and lift as they do here, to earn their feed. This is a freighting town where they haul freight with from eight to fourteen horse-teams to the mines. We also have three stage lines connecting scattered farms; so we have quite a variety of work.

I believe if my brother smith could see these freight teams start out, it would convince him that heavy pulling horses use their toes to pull with. Without the calks, on hard, muddy or rocky roads, the animals feet will certainly slip from under him, and bruise his knees, and discourage him to take the next pull. We make our own toes for draft horses. We use steel ⅜ by 1 inch wide, and cut from 3 to 3½ inches long, according to the size of shoe. We weld the calks on pitched forward at about the same angle as the slope of the toe of the foot. So when the horse sets his toe down, the calk strikes perpendicularly and, with the calk thin, it gives him a hold that won't slip. I turn the heels to these shoes about 1⅛ inches long. They turn out slightly, but there are no rights or lefts, unless the horse's feet are run over. For stage and road horses I use moderate calks and shoes plenty long enough to protect the heel. The sole of the foot without calks would

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also get bruised on rocks; more especially the flat-footed animals.

Now, I think if my brother smith would pare the feet down as low as possible and concave nicely to the frog, and use shoes as wide at the heel as possible, he would prevent or cure all contracted feet he comes in contact with, without using frog pressure, as I believe this frog pressure theory is abused to a great extent. I know these wide shoes don't look so neat as narrow or curved heels, but I believe in shoeing for the comfort of the horse.

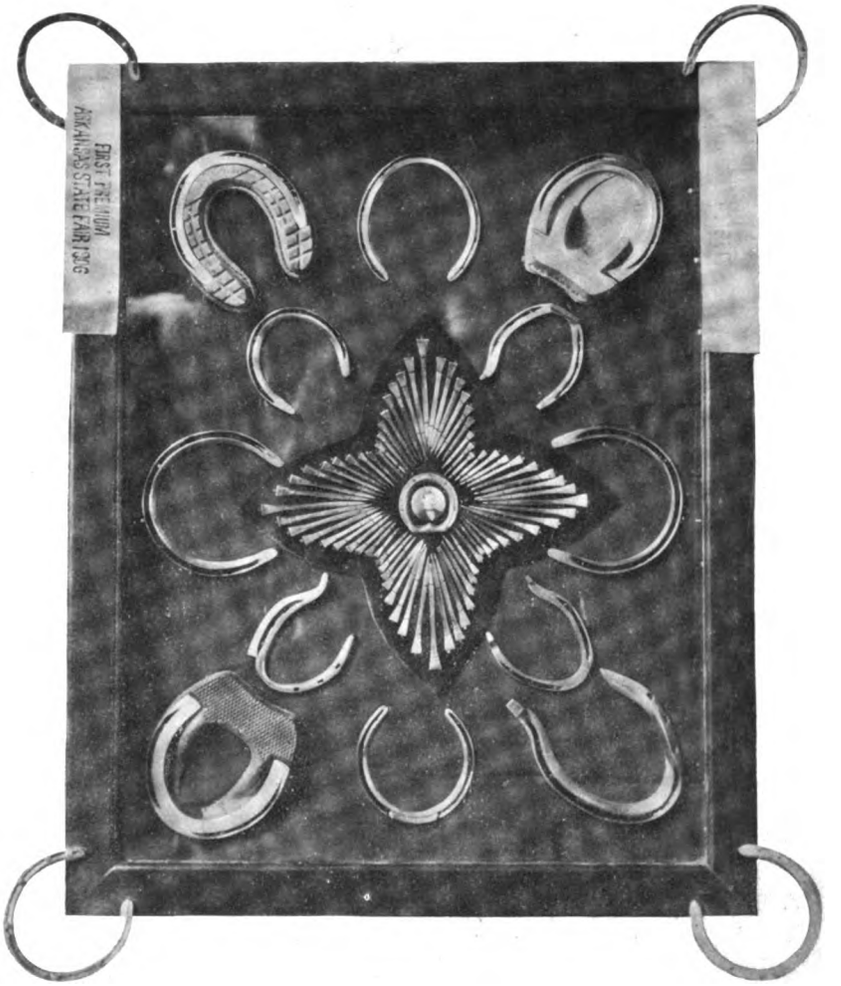
I would like some of my brother smiths to give me some light on these crooked hind shoes. I see so many of them used that look like a capital S, or some other great curve on the outside heel, while the inside heel is curved under the foot. After the shoe has been worn a while, this inside heel of the shoe sets almost under the center of the heel of the foot. I find that horses which have been shod this way invariably turn under inside and the hoof measuring one inch longer from toe to heel on outside than on the inside. This is certainly because the inside heel is not protected. Now, brother smiths, is this treating the feet right? Please give your opinion, that I may be enlightened. I mean this for common horses, not race horses, as I have no experience with them.

My experience is to use uniform shape shoes, good and wide at the heel. No right or left shoes, only where feet run over. I never burn the foot with a hot shoe. In case of interfering, I cut down the outside of the foot and build up the inside. If the inside quarter gives way and shoe bends up, use heavier shoe and nail.

My Own Shop and Work.

E. W. PERRIN.

I am of English birth, now a naturalized American. I laid the foundation of my experience as a horseshoer in the British army, some 33 years ago. I entered the forge as a supernumerary apprentice, was soon promoted to shoeing-smith and subsequently to sergeant-farrier. I attribute much of my success as a horseshoer to the thoroughness of my early training in the army. The method of instruction here, as I have frequently pointed out, is worthy of imitation in America, *i. e.*, a well-regulated system of apprenticeship. Every horseshoer should be compelled to pass an examination in all the essentials before a board of veterinary surgeons and horseshoers before being allowed to hold a card in a trade union as a first class mechanic. Those who could not pass should be ranked as second or third class, according to their ability. I maintain that if the average apprentice knew that he would have to get his certificate in order to command first class wages, he would spend more time at lectures, or with his books, and less in the saloon. Such an innovation would weed out many a man who carries a union card to-day, but the result would be a great elevation of the craft in general. Only those who are conscious of their inability would object, and the answer to them is, qualify, and thus earn the right to be classed as a skilled mechanic.



A CASE OF HAND-MADE SHOES AND NAILS FOR WHICH MR. PERRIN WAS AWARDED FIRST PREMIUM

Thirty years ago we made all our shoes by hand; front ones from bar iron, hind ones from "old pelt"—old shoes. In forging shoes from bar iron we used one striker, but in making up old stuff we used double hammer. One of the advantages in making shoes from old stuff lies in the fact that you can leave the metal where the animal wears heaviest. By this process you get a shoe that will wear well without being heavy. The machine has now, to a great extent, removed the necessity for hand-made shoes, but this is no reason why shoe-making should become a lost art. It is still indispensible in special shoeing. I have paid union wages to many a man who could not make a shoe.

I have shod all sorts and conditions of horses in England, Ireland, Canada and the United States, and in such a wide and varied experience I have met with all forms and shapes of feet and the diseases which affect them. I have met with interfering in all its phases, and have shod the meanest horses that ever walked on four legs, but for pure cussedness the broncho and mule from the plains of Texas take the cake. I never used a stock until I came to Arkansas. Here I soon found that to handle these western horses and mules I must have some machine to hold them in, so I purchased the stocks shown in one of the engravings, the best on the market at that time. By having two floormen and one fitter working at the one horse, we get the animal out of the stocks quick. This is the only satisfactory way to shoe vicious animals.

I began to write articles on scientific

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horseshoeing 25 years ago, and I have continued it for various publications in England and America ever since. I have always been a close student and a hard worker and have accomplished a great deal, but still have not mastered the art of horseshoeing. I have met cases of special shoeing which have shattered all the accepted theories and left me baffled and disappointed. So I am still a student at fifty. We are never too old to learn, for when we become too old to learn, our brains are fossilized and we are past intellectual progress. Therefore, search diligently, let failure only spur you to greater effort. To read and to think is to prepare the mind to grasp the truth, and this is the key to progress.

From the Horse's Point of View.

I was pulling away peacefully at my old corn cob, during the noon hour, and feeling generally at rest with the world, when, I must have dozed, I was startled to find myself in the centre of a group of horses. I tried to run, for they seemed to look fiercely at me, but one of their number, a big handsome gray, evidently the leader, said: "Just a minute, Mr. Shoer, we mean no harm. Just want to talk to you. We've each got a grouch and want to get rid of it."

"Well, fire away," said I, when I found it was a sort of kicker's meeting.

"Did it ever occur to you," said a sleek looking black, trotting up, "that I for instance need lighter shoes, for my work? I'm not a truck horse and what in the horse-world I want with big hunks of iron, I don't understand. It tires me, that's what it does. And, another thing, if you use lighter shoes for me you'll not need to use such large nails," and here the black emphasized his remarks by shaking his hoof dangerously near my nose.

"And I," said a heavy gray, "want you to stop rasping the walls of my feet. And for horse's sake, keep the heels of my shoes wide open so I can walk comfortably. I'm not caring about the looks—all I want is comfort. No pinching of my feet, and if you continue, it will go mighty hard with you. Seems to me I should have a word or two to say about how I am to be shod."

Brown's old Dobbin then sauntered up and turning up one of his front feet, said: "Do you know who's responsible for that?" and for the first time I noticed the heel terribly contracted and little if any frog left. But, before I had time to answer, he said: "See that you study up on these things and do all in your power to better that before I get altogether useless."

I now thought it about time I had my say, but the chairman of this horses' suffrage meeting said: "Never mind, old man, you've had your say for years. You've just done about as you pleased. Now it's our time and we will be heard." He then nodded to a sturdy little bay, which I recognized as having been in the shop several times.

"Look here, Mr. Shoer," said the bay, saucily, "I've been in your shop several times; every time I come in you say something that is generally printed in blanks. Now it's just this, my feet are very sensitive and, because I jump around and try to tell you to be careful, you cuss and use the hammer handle on me. You've simply got to use care on my feet or some day you'll be laid up with a broken arm or leg. I'm not a common laborer and I'll not be treated as such." And here I received a swish of his tail, as he galloped away.

The chairman then turned to me and, after rapping for order, said: "Did you ever think of asking a horse what kind of shoes he wants? Did you ever consult us as to whether the last shoes were O. K.? Did you ever ask a horse if his hoofs were hard and if he would like some packing to soften them? Ever ask if the hoof horn was too thin to allow of any cutting? Ever inquire whether or not the shoe pinched? No sir, you never consult a horse on anything. You think you're the whole show, and that you have some wonderful gray matter in that soot filled head of yours. But I've never noticed that you used any of it. Now this little meeting is simply a hint to you. We don't threaten, and we don't collectively ask you to do anything differently than you have been doing it, but we have it in our power to increase your trade or to decrease it. You've often heard of horses getting lame and having other ailments right after being shod. It's simply our association working a boycott. Of course, you don't want anything like this to happen to you, and we don't want to do it, but we've got to have protection. Instead of shortening our lives, you should do all you can to lengthen them. Just think it over, Mr. Horseshoer." And with a shriek they were gone. I awoke



IN MAKING UP OLD STUFF WE USE DOUBLE HAMMER



A MACHINE IS NECESSARY TO HOLD THESE MULES

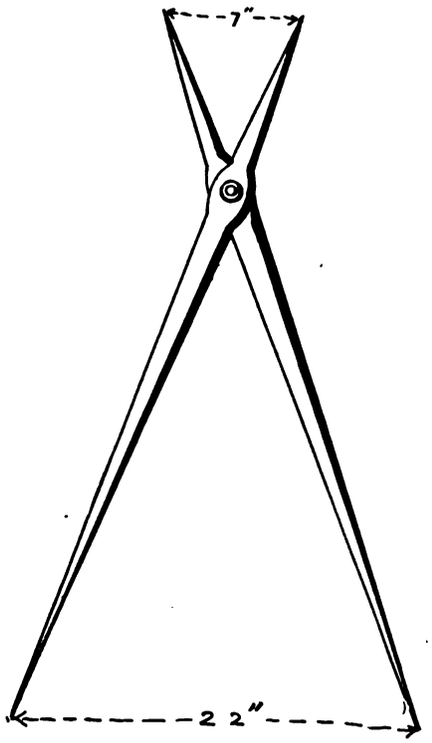
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to hear the near-by factory whistle blowing and to find the shop full of horses waiting to be shod.

A Calculating Machine and Other Things.

D. H. SPARKS.

My way of calculating material for rings and bands is very simple. I use a tool that I made some years ago that does the computing for me in



A SIMPLE TOOL FOR CALCULATING STOCK

less time than I can get pencil and paper to figure on. Make a double calper, the short end of which, when open seven inches, will figure out three and one-seventh times or 22 inches at the long end. To use this, measure the diameter of the ring at the small end, and the large end will automatically measure the circumference. I have a chart on the wall that is very handy. It is figured on the 3.1416 rule, from ⅛ of an inch to 99 inches by 16ths. If I want a 5-inch ring out of ½-inch material, I just step to the chart and run down the line to 5½ inches and find 17.27 inches. I made the chart in my spare evenings. I find it very handy when I am in a hurry. As to side line, I am rather in favor of a side line. I make and sell about 100 butcher knives every winter at 50 cents each. My apprentice makes most of them. It fills in pretty nice in the slack part of the season. I have built an addition to my shop this fall, put in a wood shop and made and sold five sleds, at slack during the fall. I got $10.00 per sled.

As to Mr. Thornton's letter on hand-made hammers, I do not see it as he does. I never think of buying a hand-made hammer, a twist drill, or a wrench. I can make better tools of the above than I can buy. I have seven hammers of different weights which I made in 1898. I have used them on the anvil and wherever I need a hammer; have dressed two of them and they are all in good shape. I buy Black Diamond tool steel to make them with. It costs me 10 cents per pound, and I find that tools made from it, if handled properly, are good tools. I also have a three-pound hand axe that I made from a piece of this steel and it is O. K.

How to Make an Axle Gauge.

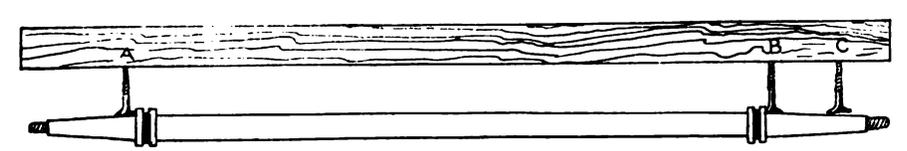
WM. FALK.

Take a strip of wood stock ⅞ by 3 inches. Make it straight and long enough to use on different length axles. Then take three common wood screws, insert them as shown at A B and C. The screws A and B must be the same heighth and should rest on the shoulder of the axle. The screw C wants to be ⅛th of an inch shorter than the others, and should strike the point of the axle when the gauge is placed on the bottom of the axle. Always heat the axle back of the collar. To get the gather of the axle, place it on the back of the axle, and then on the front, and you will see at once what to do if the wheels are straight. With little dish you need but the least bit of gather; the more dish, the more gather you want.

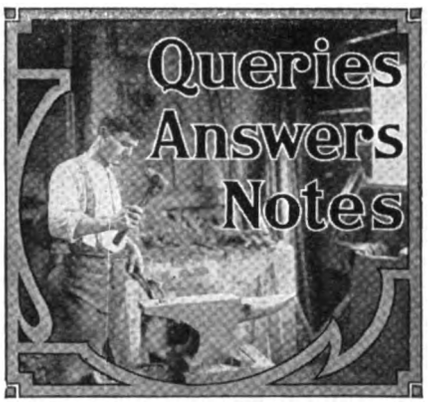
How to Replace a Broken Bell Staple.

ARKANSAW SMITH.

This is the way to put a clapper staple in a bell. Take a piece of ¼ or 5/16-inch rod iron and bend in the shape for staple. Now weld the ends together and round down to 5/16 of an inch. Drill the old staple out with a 5/16-inch drill; then take a piece of iron ½ by 1 by 16 inches long, bend in the middle, and then drill a small hole about the center. Now put in a small bolt so as to draw the ends together on the staple. Fasten the other end of the clamp in the vice, and place the bell on so the staple will come in place. Then brad enough to hold the staple until clamp is removed. Now place some brass and borax in the bell and heat enough to melt the brass, being careful not to burn the collar of the staple. When the brass melts, hold the bell so the brass will run around the staple and, if done right, the bell will be good as new, and its sound will not be impaired.



AN EASILY MADE GAUGE FOR AXLES



The following columns are intended for the convenience of all readers for discussions upon blacksmithing, horseshoeing, carriage building and allied topics. Questions, answers and comments are solicited and are always acceptable. Names omitted and addresses supplied upon request.

Wants a Trip Hammer for Plow Work.—Will some brother kindly tell me, through the columns of THE AMERICAN BLACKSMITH, which is the best trip hammer for plow work? MILO BROWN.

That Brazing Torch Again.—I would like to ask Mr. Will Warren how he generates gas in his brazing torch when the torch gets cold after using. Would like to know if the piece running from angle valve to burner is a solid iron rod or a piece of hollow pipe, and where is the coil connected to the pipe to receive the oil. Would also like to have a little better explanation of the torch, that was given in the June issue. I made one, but when I got to the angle valve, I was up a stump. D. H. SPARKS.

Welding Wide Tires.—In reply to question asked by A. Niedermeyer, in far off Australia, as to how to weld wide tires solidly, would advise him to get a supply of heavy Lafitte welding plates, and insert between laps of tires, after they are properly fitted, a piece of sufficient size between the laps. He will be more than pleased with the result. The heat required is about the same as used when borax is used as a flux, and will give better results than a sand heat. As the Lafitte welding plates are manufactured in Paris, France, no doubt he can procure a supply through some hardware dealer in Australia. GEO. NABLO.

Tongs for Pulling on Tires.—Necessity is the mother of invention. I made a pair

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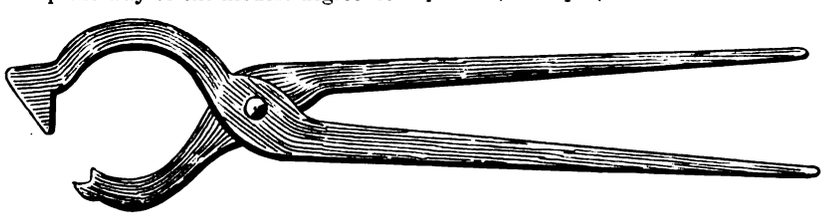
of tongs for pulling on tires, hub bands, barrel hoops or any other old thing. I have two pair, one larger than the other, and would not take $10.00 a pair for them if I could not replace them. As I live near a fork and hoe shop, I made mine out of two steel tines, ⅜ x ⅞, but S. S. steel will do. It is better, as it is much stiffer. The tongs are about 2 feet long. Let the smith make a pair so that they fit his work. One size will work on wheels from ¾ to 2 inches, or even on 4 inches, but, of course, on heavy work the jaws need a little more curve, especially the hook jaw, and the bottom one a trifle shorter. A. L. BELLIS.

A Letter from an Arkansaw Blacksmith.—My shop is 20 by 40, with a 10 foot shed on one side and on one end. I have plenty of all kinds of tools that I need, except a gasoline engine. This I expect to buy some time in the near future. For my side line I have a stock of undertaker goods, and I find it pays very well. I have a partner with me in the undertaker business, but am alone in the shop, and find some very hard work for one man; yet I manage to get along very well. I give some prices for work:

Horseshoeing	$1 to 1.25
Spoking wheel	2.25 to 3.25
Rimming	1.50 to 2.25
Setting tire	1.75 and 2.00
Wagon tongues	1.50
Wagon box	12.50

I notice a good many prices much lower than the above, but I think the above prices ought to be raised, rather than lowered. There is no use in working for such small wages. ARKANSAW SMITH.

A Letter on Starting.—Fourteen years ago I started in the business with a $40 outfit and about the same amount of experience. I trudged along for some time with my crude outfit, consisting of a 30-inch, short bellows, a 100-pound cast anvil, an old bench drill and a few small tools of like antiquity and, working early and late, barely made my salt. One day a neighbor, who was a retired smith, handed me a circular, advertising a journal published in the interests of the blacksmith. I sent for a sample copy and soon became a subscriber of the *American Blacksmith*. That, I consider, was the best spent dollar of my life. I got gems in the way of thoughts that opened up the way to the modest degree of success which I have attained. I not only learned how to do things, but learned, through its advertising columns, of the new labor-saving tools that were on the market, and as fast as I could procure the money, I have invested it in such tools. While I lack much of having my outfit complete, I can do three times the work I did before, and need not work nearly so hard as before. A. P. HARMON.



FOR PULLING ON TIRES AND BANDS THE SMITH WILL FIND IT A LABOR SAVER

A Letter and Prices from Kansas.—I have a shop 22 by 50. Have a 2½-H-P. Fairbanks engine that I have run for eight years and it is doing good work yet. I have also a vise, a set of dies, a trip-hammer of my own make, an emery stand, a band saw, a planer, a rip-saw, a spoke tenon machine, a grindstone, a drill, a shrinker, a tire bolter and lots of other tools too numerous to mention. Prices here are as follows:

Shoeing	$1.50
Setting tire	2.00
Axle	3.00
Bolster	2.00
Tongue	2.25
Hounds	.50
Spokes	.15
Felloes	.20
Plow sharpening	.25
" points	.50
Sharpening shovels	.40

Our other work is in about the same proportion. G. M. QUIST.

A Letter from New York City.—I was much edified in reading the December number in relation to the prices paid for work in various places, some of which I find are the same as paid in New York City and in the center of the state sixty years ago. There have been many changes in prices for shoeing in this city. About the cheapest for heavy plain shoes is two dollars per set. From that up to $3.50 for business, wagon horses. Carriage, coach and road horses, from $4 up to $7.50 per set. Most shops are members of the union—smith wages $4 per day, floormen $3.50 per day, eight hours to nine hours, as per agreement. Open shops, in a majority of cases, pay union wages. Open shops permit union men to work with them. The adoption of the trolley system of street cars, cut off many horseshoers. The autos have also shut off more or less horseshoeing. But the price does not decrease, however, from the fact that the increase of business of the city holds the horseshoeing industry at about even pace. The asphalt and other smooth pavements create a demand for rubber hoof-pads. Prices for wagon repairs are as varied as the colors of Jacob's coat. JOSEPH EBERLE.

An Automobile as a Helper.—I have a shop 24 by 26 feet, but it is entirely too small, and I shall build more in the spring. Have had a very busy fall, but in the winter there is not so much doing.

I bought a Rambler automobile, 1902 pattern, cheap (or at least what I call cheap, considering condition) that has a six-horse power gasoline engine in it. Can I not use that for power, by putting belts on hind wheels, for one season? Has any one tried it? I have no other power, and would like to use it until I could buy and would need a larger engine.

Our prices for work are as follows:

Plates and sharp shoes	$ .50
Setting tires narrow and buggy broad	.75
Sharpening plow shares	.25
Repointing	.75
New lays, 14-inch, per pair	7.00
Breaker, 16 to 18, each	$4.00 to 5.00
Wagon bolsters	2.50
Wagon poles	3.50

Other work in proportion, with more than the smiths can possibly handle through September and October, in this county. This is a good place for a good smith that can and will work. F. E. POBST.

A Pennsylvania Smith's Prices.—You will note that our prices are very low, but they are the same all around me, so must, of course, charge the same as others, or lose trade. I am very well satisfied, however. I have been a renter three years. I do all the work myself, both wheelwrighting and blacksmithing; have nearly enough for another man, but get the work out by working late.

Horseshoeing, per set of four, 0 to 4	$1.00
Horseshoeing, per set of four, 5 to 7	1.25
Setting four buggy tires	1.60
Moving four shoes	.50
Four buggy rims	4.00
Four buggy tires	4.00
Buggy spokes	.15
Horse cart shafts, per pair	4.00
Two and four horse wagon poles or tongues	3.50
Neverslip, per set of four	2.00

I earn from four to 14 dollars a day and, of course, do better when shoeing. The most horses I have shod in a day were 13, toeing and calking the shoes myself. I have heard of shoers shoeing 25 horses a day themselves, but I can't do that many. C. R.

Starting a Shop.—About fifteen years ago, I went to a town with two shops, very good ones of the kind. Several smiths had started in an old shop in the place and failed. To start in an old run-down shop is harder than to start a new one, and I got but little work for a long time. Nothing turned up, so I thought I would turn things up. I hired a man and team, told him to buy all the old iron he could find, except stoves. He worked four days and accumulated a big pile of old stuff for which he paid no money,—only gave orders for work. When the farmers came for work with an order, I did my very best. I now worked on the old iron pile. I saved all the bolts, rethreaded, cleaned them up and racked them. The farmers then bought the very same bolts that I got from them. I now had the old iron and castings of nearly all kinds of machines made. I sorted them and had what repairs the farmer needed on all these old machines. They would come for miles to get repairs and bolts. In this way I had a big trade in a short time. In about six months, one of the other shops closed for repairs. I worked for a good while and sold for a good price. I have now about one thousand dollars worth of tools alone. O. R. MANNVILLE.

A Letter from Kentucky.—I noticed in the queries where Brother R. S. Benson wanted some brother to advise him as to the best horse stocks to buy. I have been a blacksmith for 40 years, and have seen lots of different stocks, and I am using the Barcus now, and I think them the best I ever used or saw. I have shod mules and horses in them that weighed 1600-1700 pounds with ease. Of course, they are not the cheapest stocks on the market, but, if I were going to buy again, I would buy the Barcus. As I have not noticed many prices from Kentucky shops I will give you a few:

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Shoeing, plain, per pair	$1.00
Shoeing, toed, per pair	1.20
Shoeing, old shoes, per pair	.50
Shoeing in stocks, per pair	2.00
One new wheel, hind, 1½ tread	5.00
One new wheel, front, 1½ tread	4.50
New tires, 1½ x ½ or ⅝	8.00
One new axle	2.00
Setting old tires, $.50 each or 4 for	1.50
Wagon tongue, $1.50, with hounds	2.50

Front and hind hounds $1.00 apiece, with other work in proportion. I have a fine trade. There is another shop in town besides my own, and we get all the work we can do. I think if the country was organized it would be better. I hope to see that time come. I would like to see prices from all over the U. S., for I think it quite a help and, besides, it is interesting to all smiths J. J. PHILLIPS.

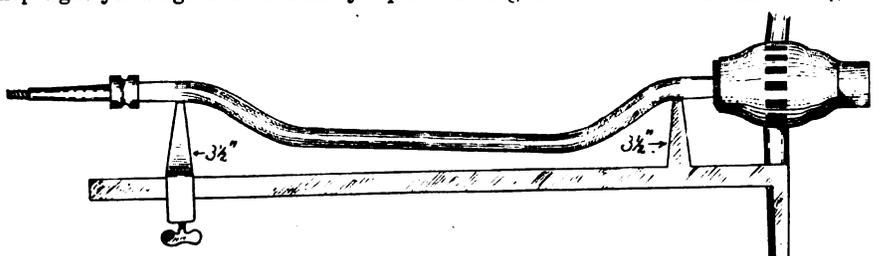
An Axle Gauge.—While I do not consider myself authority on all points in the craft, I will offer a suggestion to C. S. Bottom as to making an axle gauge. I presume he means a gauge for setting steel axles. I send herewith a rough drawing of one that I contrived which is simple in construction and has proven very effective. It requires no figuring or measuring with rule or callipers, as most other gauges. It will plumb a spoke, no matter what the dish may be. In cases of wheels of a set having different dish, it is best to mark the wheel and spindle, to avoid getting them on wrong when setting up.

W. S. Smith, in the December number, voiced my sentiments on the cold tire setting question. I have a House machine which I have used four seasons and sorry, indeed, would I be to be compelled to go back to the old system of sweating them on. I never fail to get the right dish, which (as I believe) no man can do on all classes of wheels in all conditions under the hot process. As Bro. Smith said, "The only question is what make of cold tire setter is best." A punch and shear is a great labor saver. I have George Sear's device, which is very good. A. P. HARMON.

A Letter from Canada.—If Mr. J. F. Boyd wanted to dish a wheel that has been turned backwards and do it cheaply, just take the same tire to back of wheel and he will find he has all the dish in his wheel he requires, without taking all the spokes out and wedging all the spokes. Also we don't think he could do jobbing trade in this town very long and use old shafts for single-trees on buggies and spring bars. Then the man who drilled a hole in the end of an axle arm and screwed a plug into the end and drilled a key hole through the axle and pin with a breast drill, because the owner of the rig told him he could not weld on a steel arm, he could not be in a very busy shop, or he would let a job like that go to a smith that had nothing to do.

We had the prices of shoeing raised to fifteen cents and thirty cents on April 1st this year, and this fall an old coon that could not shoe a horse himself if he was to be hung for it, opened up a shop here and put on two men and cut the price to ten and twenty cents. We had to reduce the price again to ten and twenty-five cents. I have been working at blacksmithing for twenty-five years and would not bother learning my own son the trade, just because I think there are lots of better trades and not half the hard labor, although we do a good trade, and are making a dollar or two; yet we, like all other smiths, have to work hard.

I see lots of smiths have trouble to make collections. We don't. We started this shop eight years ago and have not yet put



AN EASILY CONSTRUCTED DEVICE WILL MAKE THE SETTING OF AXLES EASY

$25 on our books that we could not collect at short notice. We know all the people in this district, and to the hard shells we just simply say we have not time to do their job. And, if they insist on our doing the job, we collect before the job leaves the yard That is strictly our method of doing business. W. H. BROOKS.

A Smith in Indian Territory.—I have read a great deal about my brother blacksmiths, the way they started and how they are getting along, and now I will tell my story. I always wanted to be a blacksmith and could not go with anybody to learn the trade. But I never gave it up. It was seventeen years ago, in the first settlement in old Oklahoma. I had just $25, and went to town, bought a pine board and made a blower and borrowed some anvil tongs, and came home and started to learn the trade. I went up against it hard, but never gave it up. Finally I made a good success. I kept getting better tools and, when I got my deed for my homestead, I put a mortgage on it and bought a shop building in town and took in a good blacksmith. We got along fine for six months, when my partner drank more than he worked. We quit, and I took in another partner for eight months. I then hired a man and worked so hard that my health failed. I sold out everything and rested for two years, took a trip across the Rocky Mountains and got to feeling all right. Four years ago this April, I came to Indian Territory with $2,000 in cash and started in again. I now have a good home, three good residence lots and the two lots that my shop stands on—finest location in our town for a shop.

My shop is 24 x 72, boxed, sided, painted and all floored. I have a little Giant hammer, a power drill, a boring machine, an emery stand and rip saw combined, one Western Chief power blower and three fires, one hub boring machine, a ten-horse International gas engine and all kinds of small stools. My shop is lighted with gas and electric lights, and I have $1,400 worth of blacksmith supplies of all kinds, and I do not owe a dollar. I do a cash business and pay cash for everything. I keep one man all the time, and in the busy times two men. I pay my help every night and have a large trade. Now, brother blacksmiths, you can see I had quite a hard time to get my trade, but where there is a will, there is always a way. V. GIEBER.

A Smith Story from York State.—Some of our brother smiths seem to think that a man cannot be a good smith unless he has learned his trade from some one else. I was brought up a lumberman and farmer, and have a good big stock in the farm; yet I was forty-one years old when I began to work at blacksmithing. I had the tools on the farm about three years, did my own work and some for my neighbors, and then got a chance to rent an old, run-down shop for three dollars a month, without a tool in it. I rented my farm and went to work. There was not enough iron work and shoeing to keep me busy, so I went to repairing wagons, and learned that in the same way. I stayed there two years and did $700.00 the first year and $1,000.00 the second year. Then I got a chance to buy out a brother smith five miles above for $855.00, with a good house and lot, and a good new shop, 24 by 32, two stories. I have been here now for over five years and have run my business from $1,000.00 the first year and my work is increasing all the time. I have a good all-round man with me now, and we have all we can do and more. I heartily agree with Robert Sutherland that when a man hangs out his sign, "Horse-shoeing and General Repairing," he has enough to do without a side line. When work is slack, I iron off neckyokes and singletrees, make chain hooks and clevises, calk shoes and fix up and sharpen tools. I started in a "green horn," but have made a good success of it, anyway, whether I know anything about it or not. I paid for my house and shop in just four years, and put on a lot of improvements besides. I think a man, to make a good all-round smith, must have a lot of pluck and a head of his own, and be ready to pick up every good chance he sees, and be ready to give anyone of his customers a square deal. I keep a man in the busiest time of the year only. I can do about $1200 a year alone. I have got the reputation for being the best all-round smith in the town, and think my work will prove it. I do not always weld a spring or pitman or axle stub at one heat, but have yet to find one I could not weld so it would stay welded. I have fixed hundreds of jobs that other smiths would not touch, and have a reputation for fixing anything that comes along. J. B. HARRIS.

A General Smithy of Nebraska.—The engraving on page 120 shows an exterior view of my shop, with yours truly in the foreground. My shop is 36 by 36 feet. I have been located here since 1885, when a good deal of the prairie was unbroken. I have a Stickney gasoline engine, a two wheeled emery stand, a clipper shear, a set of full mounted Easy screw plates, a tire shrinker and many other tools. As a side line I sell harvesting machinery

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and veterinary remedies. I have worked at the trade since 1869, part of the time in Germany and Sweden, but for the last 25 years I have worked in the United States. S. ANDERSON.

Discipline in the Railroad Blacksmith Shop.—There is no branch of the railway machinery department more in need of a reasonable discipline and a perfect system than the smith shop. If this shop is lax or indifferent in its government, not only will the other departments suffer, but every artery in the whole system will become congested. We may plaster the shop completely with the definition of discipline, yet to no effect without the application of its principles—education, government, instruction, regulation.



A NEBRASKA SHOP RUN BY GASOLINE ENGINE POWER

We cannot discipline others if our own education along the same line has been neglected. Neither can we secure and retain in our shops, sober, honest, industrious, right-thinking men, and live in opposition to right principles ourselves. We are seen as we are; either irritable, untruthful, intemperate, profane, unscrupulous, or affable, truthful, clean-mouthed, appreciative, progressive, fair-minded. Discipline does not mean gruffness, harshness, or a long face and knitted brow; but rather the reverse. And, when accompanied with the right spirit or proper understanding, is generally productive of a kindly feeling between the foreman and the workmen.

We cannot have discipline without system; nor good system without classification; nor classification of the work without classification of the men, and we cannot classify either the men or the work, without a thorough practical knowledge of our business. These qualifications are only attainable through an experience that includes the solving of each problem in shop requirements correctly, as they are presented to us.

Classification of work makes the workman responsible for it, and consequently more careful with it. While it is necesary that a certain number of items or pieces be made in a certain number of hours, they should be made perfect. When a certain number of articles are produced by one workman, and a duplicate order by another, the responsibility of failure or breakage, while in service, is not easily placed. This fact is frequently taken advantage of in the use of the fuller, or hammer pene, to hide defects that the foreman or inspector, whoever he may be, cannot detect. But if certain work is done by a certain workman, and is "his" work, he will not fuller shut a gouged corner, or pene the point of a loose scarf, a cold shut or an overlap in a fillet.

To have a good system we must have uniform or established methods of production. This is necessary to the greatest and best output in any railway shop, and it will remove the cause for any foreman having to exaggerate the output of his shop. And, if we do not exaggerate, the other fellow will have less inducement to "stretch" matters about his shop.

The best interests of the company are served by making our own blacksmiths, either by apprenticeship or by promoting bright, ambitious helpers. The writer's experience has led him to prefer the latter as the best material from which to make profitable blacksmiths for the company, and, at the same time, help those who are anxious to help themselves. In promoting helpers, we have our pick and choice from many who have already given evidence of making just such men as we need to handle the work in a smithshop. And I wish to say, while on this subject, for the benefit of those whose business it is, that when these men, educated in our own shops, become first-class workmen, they should receive first-class wages, and not be permitted to accept a position elsewhere for the sake of ten or fifteen cents per day, while a stranger, an inferior workman, is given the position and the rate of pay the other man should have had. Following are a few arguments in favor of making and retaining our own workmen: They know the foreman, his disposition, ambition, etc., and are unconsciously governed accordingly. The foreman does not only know the dispositions and abilities of his own men, but recognizes their weak points as well, and in helping them overcome these makes them better men. These men know every tool in the shop, where it is kept, and have used or seen it used, and know the established daily output of the tool or tools. We will also have less labor trouble with men educated in our own shop than with the itinerant mechanic, whose employment may make a parallel of the case of the one rotten apple spoiling every other apple in the barrel. And, again, if we engage several workmen from as many different shops, and permit each one to bring with him the discipline, time for doing work, and the ideas of quality that governed these points in the shop he came from, our shop system wauld be speedily demoralized.

We frequently hear foremen in the medium or small shops complain that they cannot compete in the cost of output with the large shops which have special machines. Yet they do not have to meet the price of the special machine man on special work to be equally as profitable to their companies. In large shops and on large systems where the various items are made by the thousands, special machines are profitable and necessary, but in the small or medium shop there are generally just enough men to take care of the jobbing or running repairs when the demands are greatest. This demand is not constant or regular. The requirements of today call for our best efforts, and no false movements; tomorrow there will not be sufficient repair work to keep the men employed at the same speed as yesterday, and every man that can be spared from the repair work, at any time, should be placed, immediately, on the special or new work with such tools as we may have—the steam hammer and, possibly, one or two other machines. It would not be profitable to install costly special machines, in such cases.

Without system and much thought in the allotment of work for bulldozers, heading machines, etc., there will be much time lost. Orders for items to be produced by machines should be large enough to try the capacity of the machine for, at least, one half day, or one or two full days, and sufficient to meet all demands for that item in the next thirty days. All similar work should follow in turn, avoiding, as much as possible, the most complicated tools as well as the changing of furnaces. We recognize the fact that with special machines new work can often be produced for less money than the old item can be repaired. Yet, on most, or many, of our railroads the repairs to foreign cars is quite an item, and it would be impossible, at least not profitable, to have machines for producing this class of work in the new; there being scarcely two duplicate pieces called for in the same day.

Admiral Togo's victories were not won by a preponderance of armament, but by superiority of skill. It is not in the possession of a surplus of special or individual power machines alone that our success and the success of our shop depend, but rather in our brain power, or ability to supply a limited number of power machines with sufficient easily adjustable formers, dies, etc., so that each machine may be utilized for a multitude of purposes.

To obtain the best results in the railway smithshop, or, in fact, in any shop, there are many things the foreman should not do, which are almost equal in importance to the things he should do. He should not be gruff with his men; he should not have those who are termed "pets" in his shop; neither should he show partiality; he should not speak lightly of any one of his men to another: or even make possible inferences to his discredit, for such a thing is one of the meanest ways of taking advantage of another. The foreman should not try to force impossible results from his workmen, for they will invariably lose confidence in his ability and judgment; neither should he, in dealing with his men, handle the truth carelessly. A. W. M'CASLIN.

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FILES AND RASPS

Blacksmiths Recommend Our Rasps

——BECAUSE——

THEIR WEARING QUALITIES HAVE BEEN PROVEN.

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Prices Current — Blacksmith Supplies.

The following quotations are from dealers' stock, Buffalo, N. Y., Feb. 1, 1907, and are subject to change. No changes have taken place since last month's quotations.

All prices, except on the bolts, are per hundred pounds. On bars and flats prices are in bundle lots.

Bars—Common Iron and Soft Steel.

¼ in..	round or square;	Iron,	$2.95;	Steel,	$2.95
⅜ in.,	"	"	2.55	"	2.40
½ in.,	"	"	2.35	"	2.20

Flats—Bar and Band.

¼ x 1 in.,	Iron.....	$2.40; Steel.....	$2.40
¼ x 1½ in.,	"	2.30; "	2.30
3-16 x 1½ in.,	"	2.50; "	2.50

Norway and Swedish Iron.

¼ in., round or square.....	$4.90
⅜ in., " "	4.50
½ in., " "	4.30
¼ x 1 in.....	4.30
¾ x 1½ in	4.20

Horseshoe Iron.

For No. 1 shoe, ⅜ x ½ in.....	$2.50
For No. 2 shoe. ½ x ⅝ in.....	2.50
For No. 3 shoe, ⅝ x ¾ in.....	2.50
For No. 4 shoe, ¾ x ⅞ in.....	2.50

Toe Calk Steel.

½ x ⅝ in. and larger..... $3.00

PATENTS FRANKLIN H. HOUGH, Washington, D. C. No attorney's fee until patent is allowed. Write for Inventor's Guide.

PATENTS Write at once for most liberal offer ever made for obtaining patents and ask for Inventors' Guide, the best book published Est. 20 yrs. WM. N. MOORE, Wash. D. C.

PATENTS Herbert Jenner, patent attorney and mechanical expert, 608 F St., Washington, D. C., established 1883; I make an examination free of charge and report if a patent can be had; also the exact cost. Send for circular.

PATENTS PROTECT YOUR IDEAS

Send for Inventor's Primer. Consultation free. Established 1864.

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852-14th St., Washington, D. C.
Branches at CHICAGO, CLEVELAND, DETROIT.

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Blacksmith and Wagon Makers' Supplies,

PEORIA, ILL.

THE BARLOW HARDWARE CO.
CORRY, PA.
Carry a complete line of Horseshoers' Supplies, Wagon and Carriage Material
Write for Our Complete Catalogue of Blacksmith Supplies.

The Campbell Iron Co.
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Carry complete line of Horseshoers' Supplies, Wagon and Carriage Material.
WESTERN AGT. FOR DITZLER COLORS IN JAPAN.
Write us your requirements.

THE
Williams Hardware Co.
Minneapolis, Minn.
Wholesale IRON, STEEL and HEAVY HARDWARE.
CARRIAGE AND WAGON WOODSTOCK.
HORSESHOERS' SUPPLIES.
Send us a Sample Order.

WANTED AND FOR SALE.

Want and for sale advertisements, situations and help wanted, twenty-five cents a line. Send cash with order. No charge less than fifty cents

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FOR SALE—Shop, tools and stock. 13 acres of land, house has seven rooms and a good cellar. Address HERMAN SANNING, Jefferson City, Mo.

AGENTS WANTED—For "Wabble Cure" buggy nuts. Big commission. HARDWARE CO., PONTIAC, MICH.

FOR SALE—Blacksmith, Wood and Horse Shoeing shop. Good location, with all the tools and material, on easy terms. Address, G. A. MOHLE, Lock Box 396, Eagle Lake, Texas.

FOR SALE—Blacksmith shop, size 22 x 64. Work for two men. No opposition. Will sell stock and tools. Reasons for selling given by addressing FRANK ZEMANEK, Dundee, Iowa.

WANTED—A good general Blacksmith and Horseshoer. Work the year around. $3.50 per day to the right man. Apply to FOSTER & McLEOD, Macleod, Alberta, Can.

WANTED—Blacksmiths to handle Mineral Heave Remedy. No cure—no pay. Liberal terms to agents. Write for booklet, MINERAL HEAVE REMEDY CO., 418 Fourth Ave., Pittsburgh, Pa.

WANTED—Traveling men who visit the carriage, implement and livery trade make big commissions, selling our steel and rubber-tired wheels, as a side line. Why don't you try it? THE BOOB WHEEL CO., Cincinnati, O.

FOR SALE—A better than the average horse shoeing and blacksmith shop. Fine town, Northwestern Iowa. Good buildings. 2 lots. All necessary tools and stock. 2 fires, gas engine. Horse shoeing alone $3,000 per year. Owner must sell. Price $2,300. If you wish to buy, sell or exchange, send for our sales and exchange lists. MYERS & MYERS, A. 25 Matthews Building, Milwaukee, Wis.

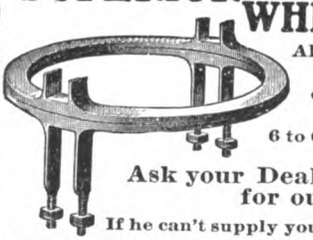
FOR SALE—The best equipped general blacksmith and wagon shop and Tank factory in Central Nebraska. Electric Power, all tools and necessary machinery. Good stock of material. $9,000.00 done in 1906. Will lease or sell real estate to suit purchaser. Shop is 52 ft. x 100 ft., two floors. Reason for selling given on request. Address, N. F. T., 729 Lincoln Ave., York, Nebraska.

FOR SALE OR RENT—Established in 1885. Blacksmithing and horse shoeing shop. Paint and carriage shop, doing general repairing, bicycle work, etc. Good business for two men, the year around, and three men during busy season. Shod 150 horses and sold sixteen new wagons last year. Good reasons for selling. Write to GEO. H. BAKER, East Moriches, N. Y.

GOOD BLACKSMITHS ARE SCARCE AND BUT FEW LEARNING THE TRADE.

And the smith comes first of all professions or trades. The smith must make the tools first for all, from the surgeon to the safe blower, by using Toy's Treatise on new steels explaining how to work them with 75 new methods for working all difficult jobs. Ten receipts for making your own compounds for welding different kinds of steel solid. Thermite welding fully explained: also two colored tool tempering charts; chart A explains all annealing and hardening; chart B explains both scientific and plain tempering to a standard. All the above for $1.00. Valuable samples free. W. M. TOY, Sidney, Ohio.

SUPERIOR FIFTH WHEELS



All weights and diameters from 6 to 60 inches.

Ask your Dealer for our line.

If he can't supply you write us.

MILLERSBURG FIFTH WHEEL CO.,
MILLERSBURG, PA.

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The plant formerly owned by the Forsberg Spring & Gear Co., Rome, N. Y., fully equipped with machinery, tools and appliances and a stock of materials, ready to manufacture, will be sold at public auction, on the premises No. 312 South James Street, Rome, N. Y., on Wednesday, February 27, 1907, at 11 A. M.

The inventory and schedules may be seen at the office of the assignee or his attorney.

A good business chance.

George T. Davis, Assignee,
City Hall, Rome, N. Y.

Ward J. Cagwin, Attorney,
No. 132 W. Dominick St., Rome, N. Y.

ONLY 60 CENTS Did you ever try to shoe a horse that would not stand still? By the use of my great *Pulley Breaking Bridle* you can make the most restless horse stand as quiet as a lamb—even ugly horses, stallions etc., completely subdued while being shod. Price, Only 60c postpaid. You should own one.



Will bring business to you. Send for circular telling all about it.

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Vertical 2, 3, 4, 5, H. P.
Horizontal 5, 10, 12, 15, 20, 25, H. P.

Designed and Built for BUSINESS.
Catalogue on request. . . . . .

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BOLSTER SPRINGS.
Also Wagon Seat, Truck and Platform Springs

Catalogue Free



Sold by Leading Jobbers or Write us

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RACINE JUNCTION, WIS.

REPAIR MEN, ATTENTION!

We have a one coat Jet finishing Varnish, which has the color and the varnish combined in one coat which you cannot afford to be without in your business. Price 80c per gallon delivered at your R. R. station in 10 gallon cans. The best thing for finishing up old work as well as finishing up new.

HARDIN-HATTON CO., Ft. Wayne, Ind.

DEATH TO HEAVES! NEWTON'S



Send for Booklet.

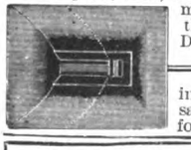
Heave, Cough, Distemper and Indigestion Cure will effect a permanent cure for the ailments named. Recommended by veterinarians and owners. Every druggist in America has it or can get it.

$1.00 per can, of dealers, or express prepaid.

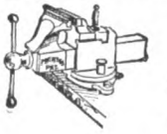
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THOMPSON EXTENSION TUYERE IRON CO.,

Indianapolis, Ind., manufacturers of The Best and most Reliable Tuyere Iron on the Market. Size 15x20 in. Depth 5½ in. Weight 65 lbs.



Long or Short fire, from 2 to 14 ins. Great Fuel Saver. Thousands in use, ask your Jobber for them, or write us direct.



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ALL STYLES AND SIZES FOR ALL USES
LARGEST LINE IN THE WORLD
ILLUSTRATED CATALOGUE · FREE
PRENTISS VISE CO.
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WESTFAHL (MILWAUKEE) RASPS
Can't be excelled for durability. "Hand Punched."



Our new 18 inch rasp. Round ends.

Ask your dealer for the Westfahl brand. If he can't supply you write us your requirements
Mention The American Blacksmith,
WESTFAHL & CO., Milwaukee, Wis.

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BRITTLE HOOFS, CRACKS



MR. BLACKSMITH:

You know the common cause of brittle hoofs. We want you to know the most satisfactory cure and preventive.

It is O. K. HOOF REMEDY.

It's the little things that count in business and this is one of the little things that will count in increasing your shoeing patronage more than you would imagine. When a customer finds under your care his horses feet remain in fit condition under all circumstances he is going to stick by you and also advertise your shop to his friends.

You can keep any hoof in FIT condition—prevent cracking, breaking, splitting or soreness with occasional applications of O. K. Hoof Remedy. You can grow an entire new hoof in nine months with this grand remedy.

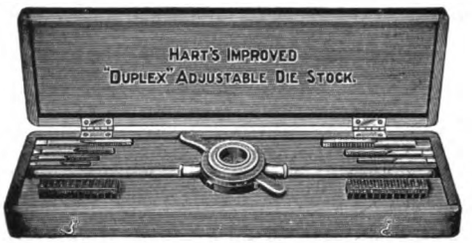
O. K. Hoof Remedy can be depended upon to keep hoofs firm, tough and elastic and also to cure corns, contracted feet, thrush and all hoof diseases. It will help you to bigger patronage by keeping your customers better satisfied and the cost to you will be slight. In fact you can act as our agent and sell it to your trade, thereby picking up a good many extra dollars. Suppose you send 15c for a sample and write for agents' terms—but do it now.

Remember we guarantee it—money back if it fails to do what we say it will. Price $1.00 per can.

O. K. STOCK FOOD CO., 650 Monon Bldg., Chicago

SHARP DIES

Are what are needed in order to cut good threads, and you can always have them if you use a



"DUPLEX" Die Stock Set.

The dies in these sets are easier to sharpen than a knife; this fact enables you to get the full wear out of them. **Write us.**

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The Best Design Material Workmanship

O. M. Milk Wagon Gear No. 251

We will exhibit both in New York and Philadelphia, and as in other years we will lead.

Our New Gear Catalogue is now ready for distribution and will be sent FREE to any one.

SEND YOUR NAME TODAY!

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NATIONAL TWIST DRILLS.

FORGED STEEL WRENCHES.



LONG "S" PATTERNS FOR BLACKSMITHS.

Set of five (5) wrenches fitting nuts on bolts 3/16, 1/4, 5/16, 3/8, 7/16, 1/2 in., 6 1/4 to 10 1/2 ins. long.

The Whitaker Mfg. Co. CHICAGO.

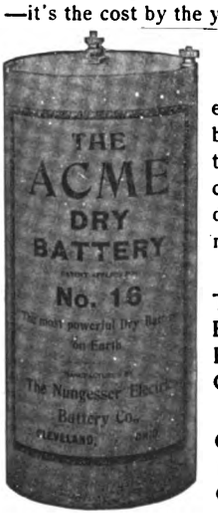
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How many cells have you used—what was their original cost and what was their average life. That's the basis of the problem.

Say for example you buy a cell at a certain price. It lasts two years. Any other battery bought at a lower price, but which lasts only six months, is a poor investment.

The cost must be figured by the year. The ACME DRY BATTERY may cost you a little more in the beginning.

But the original cost is of slight importance—it's the cost by the year that tells the tale.



There are 19 year's experience in scientific battery making behind the 16 Acme. That accounts for its power and durability. Look for the name.

THE NUNGESSER ELECTRIC BATTERY CO., CLEVELAND.

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READERS!!

Your attention is called to the IMPORTANT article on

PAGE 109

OF THIS ISSUE.

READ and ACT.

THE "BUSH" Low-down Handy Wagon

WITH 4-IN. TIRE STEEL WHEELS

Our wagons are well ironed throughout—wheels made with round staggered spokes.



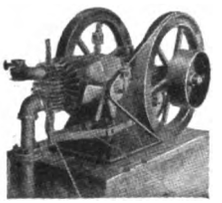
We make any size wheels to fit any skein.

We manufacture a complete line of metal wheels for corn planters, cultivators, plows, etc.

WRITE TO **C. BUSH, QUINCY, ILL.**

(MENTION THIS PAPER.)

A Good Engine at a Low Price



5 H. P. Air Cooled

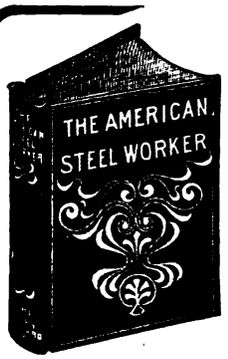
No troublesome water jacket.

No engine ever before constructed with so few working parts.

Write for Circular and Price.

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BIGGER AND BETTER THAN EVER

IS THE NEW EDITION OF

THE AMERICAN STEEL WORKER

New binding, new paper, new everything, and a big chapter on High Speed Steels added. It's written in good plain English and tells you just what you want to know, whether it is buying, working, tempering, hardening, welding or selling steel. Tells you how to build furnaces, make baths and the hundred and one other important features in steel working. Markham has had over 27 years' experience at this sort of thing, and he knows. We'll send the book on approval if you desire. It contains over 350 pages, well filled with good Illustrations, and is neatly and substantially bound in green and gold.

PRICE, $2.50

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GEO. SEARS & SON,

MANUFACTURERS OF THE

SEARS BLACKSMITHING DEVICE

AN ABSOLUTE NECESSITY IN EVERY BLACKSMITH SHOP

Onslow, Iowa, Jan. 7, 1907.

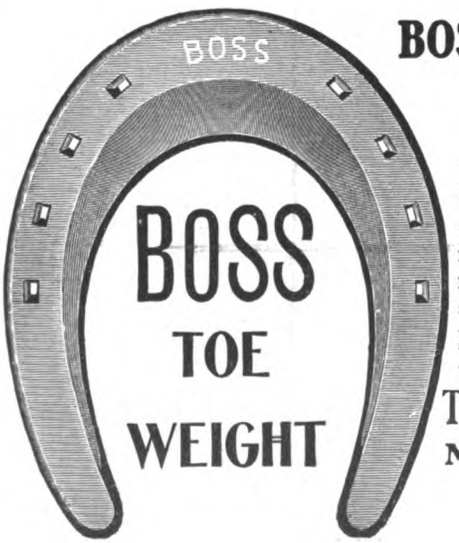
AMERICAN BLACKSMITH COMPANY,
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Gentlemen:—

Our machine I claim is the best on the market. It has thirty-two ton six hundred and twenty-five pounds power, figured by B. Walters, expert. I will give the machine and two hundred dollars to any one who can bring a machine that will come up to it for jobbing and wagon shop combined. You can send money to the bank here for sixty days. If the machine don't do as advertised, you keep the machine and draw the money, but if the machine does do as advertised, I draw the money. I have nothing to do with the money while it is in the bank. Whoever buys this machine gets the use of my patent shovel point and solution for hardening. My time piecing a shovel is 3½ minutes. I will instruct how to piece them. W. T. Sears, weighing 129 pounds, cuts ¾ by 3 inches wide and cuts ½ inch, 3 inches wide with one hand. He also punches ½ inch hole through ⅝ inch iron with one hand with a four-foot lever. All tests must come to Onslow, Ia., to be made. The late improvements all go with the machine.

Yours truly,

GEO. SEARS & SON.



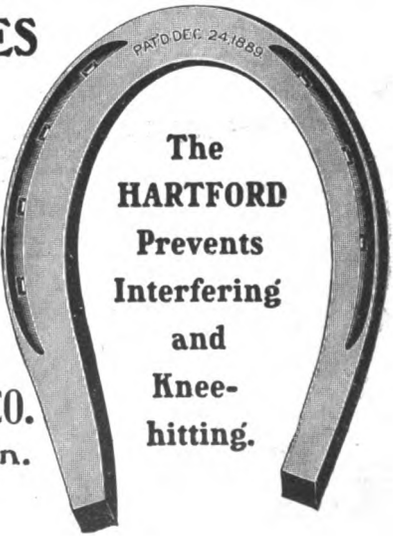
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CARRIED IN STOCK BY ALL LEADING DEALERS

Have the highest reputation among the trade. Conceded to be the best sideweight and toeweight shoes made in this country. Cost same as inferior makes. Mean less labor. Are far superior to a hand made shoe and always give good satisfaction. Sold by all leading jobbers. Sample pair sent post paid for 50 cents. Send for circulars. They are free. ✕ ✕ ✕

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Mechanic Street, Hartford, Conn.



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No other tool so popular. Prominent dealers sell them.
Mechanics swear by them. Economical manufacturers buy them.

ASK FOR CATALOG C.

MILLERS FALLS CO., 28 Warren St. NEW YORK.

SEE PAGE 4

Do you want to increase your profits?

READ PAGE 4

Do you mind seeing a few extra dollars coming your way?

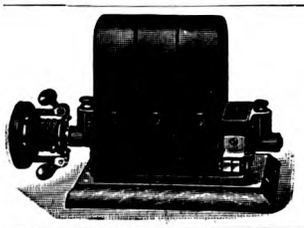
SEE PAGE 4



HAND MADE WOOD HUB WHEELS

Built in our own Shop. Best of material and workmanship. Fully guaranteed. **Prompt shipments, prices right.** Send us a memorandum of the number of sets you want. Give size of hub, spoke and felloe, also height, and let us quote you interesting prices. If wanted tired, state thickness of tire. Ask for free catalog.

CRAY BROTHERS
Cleveland, Ohio.
Dept. A.
Manufacturers of Lumber Wagon Wheels, Carriage Tops, Seat Trimmings, Axle Gauges, etc.



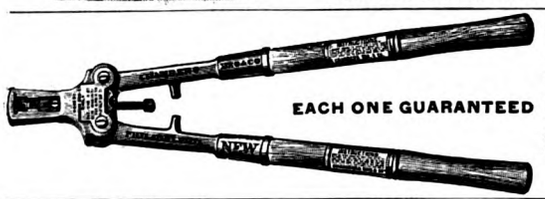
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Fires your gas or gasoline engine without the aid of batteries.

It is better and more durable than any Dynamo. Its Governor regulates the speed regardless of speed of Fly Wheel. Its Governor adjusts to imperfect Fly Wheels. Its Governor insures a constant and uniform spark. The spark does not burn the contacts of the engine. All strains are removed from the bearings of Magneto. FULLY GUARANTEED. AGENTS WANTED.

HENRICKS NOVELTY CO.

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BOLT CLIPPERS

EACH ONE GUARANTEED

CHAMBERS BROS. CO.,
N. Fifty-Second St.,
Philadelphia, Pa.

GOOD RULES TO GO BY



BLACKSMITHS' HOOK AND HANDLE RULES

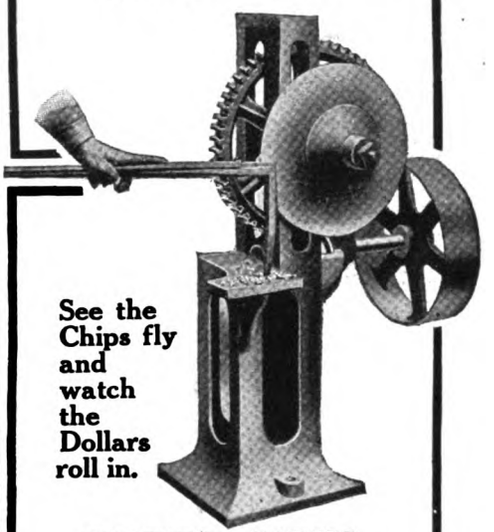
Made from hard rolled sheet brass, one-tenth inch thick, one and one-sixteenth inch wide, with heavy gradations and figures, graduated from the end in sixteenths of an inch on one side and from the inside of the hook in sixteenths of an inch on the other, adapting them for taking correct measurements from either the outside edge of a hot piece of iron, or from the inside when held against a corner. Graduated twelve inches, have flat handles and measure over all sixteen and three-fourths inches.

Price, postpaid, $1.15. **Catalog of fine Tools Free.**

The L. S. STARRETT CO., ATHOL, MASS.

THE
BLACKSMITH
THAT BUYS THE
MONARCH DISC SHARPENER
GETS THE BUSINESS.

Don't let your Neighbor Do it First



See the Chips fly and watch the Dollars roll in.

ORDER NOW and Cinch the Trade in your Section.

The Wonderful Work that this Machine does can hardly be believed—but seeing is believing. . . . . .

REMEMBER it was designed by a practical smith and is made by the oldest and largest Iron Works in the West.

INTERESTING CIRCULARS SENT FREE. WRITE TO

The MURRAY Iron Works Co.
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Successful Shoeing of Lame Horses,
write to the
HUMANE HORSE SHOE CO.
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the Manufacturers of the Humane Cushion - Heel SHOES.

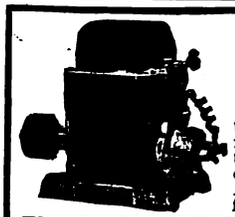


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They Never Fail to Please
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TOLEDO, O.

ONLY 60 CENTS Did you ever try to shoe a horse that would not stand still? By the use of my great ***Pulley Breaking Bridle*** you can make the most restless horse stand as quiet as a lamb—even ugly horses, stallions, etc., completely subdued while being shod. Price, **Only 60c postpaid.** You should own one.



Will bring business to you. Send for circular telling all about it.
PROF. J. W. BEERY, PLEASANT HILL, OHIO.



"QUICK ACTION"
IGNITING DYNAMOS
Excel all others!
The only generator that cannot lose its magnetism. For either make and break or jump spark work. Also spark coils. Send for Catalogue B.
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BARRETT'S
Pure Paint Products
Specially adapted to Carriage work. We make the "one thing best suited to your purpose." We want to send out ten thousand samples during 1907.

A sample will make you a Customer.

Goes furthest. Stands Best. Costs least. **It costs you nothing to investigate and it pays.**

Write us your requirements. We will tell you something that will interest you.

PRICE, QUALITY, SAVING OF TIME, ALL FOR A POSTAL.

The C. A. P. Barrett Co.
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Manufacturers **Dayton, O.**

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To Find Address of any Firm given here, consult their advertisement. For its location in this issue, see Index on Page 25.

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Heartley Machine Works.

Angle Benders.
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Columbus Anvil & Forging Co.
Columbus Forge & Iron Co.
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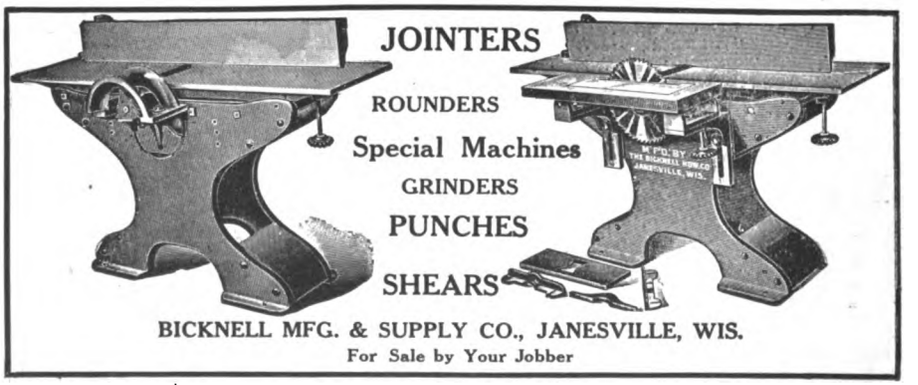
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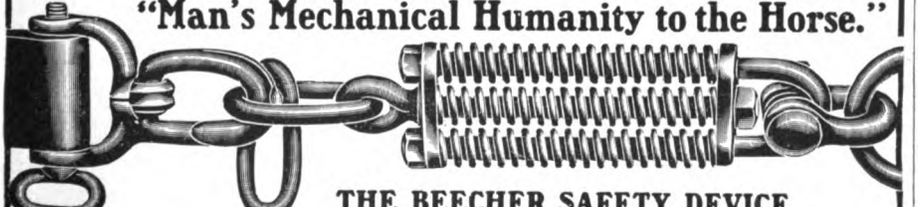
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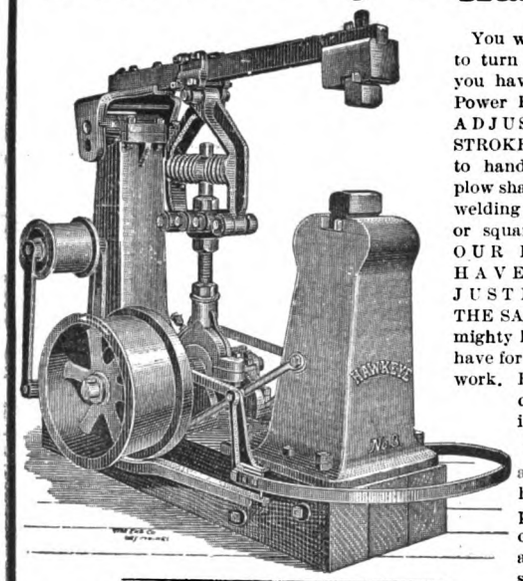


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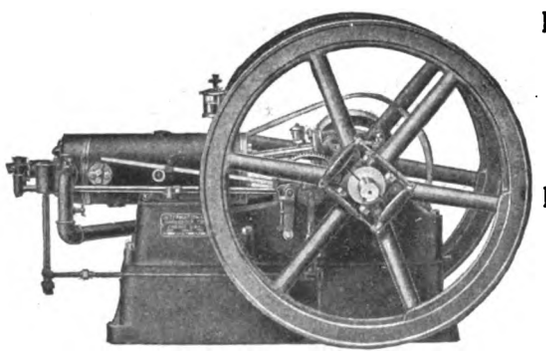
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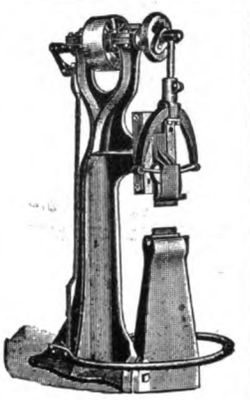


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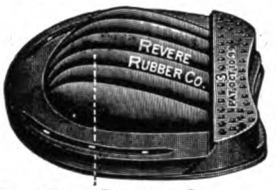


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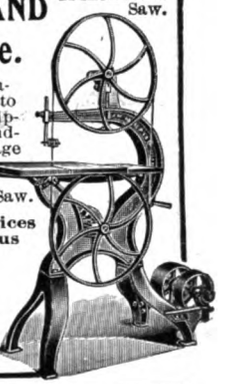


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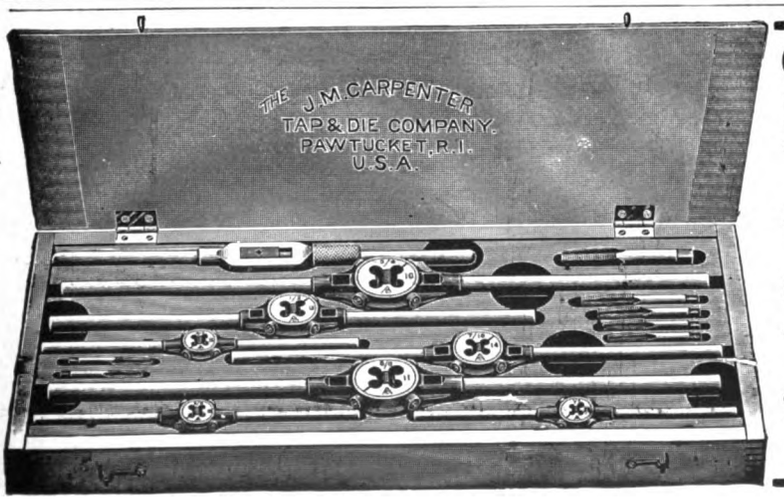
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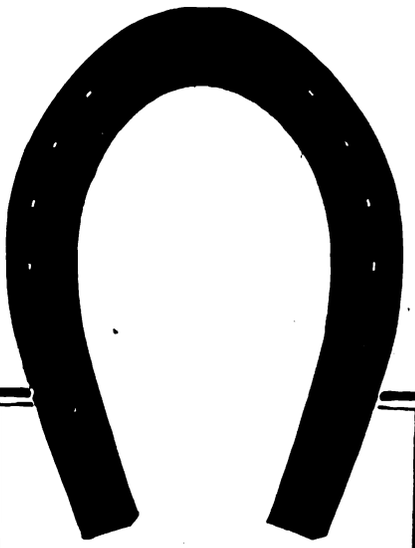
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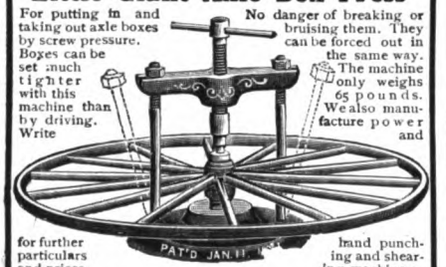
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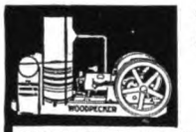
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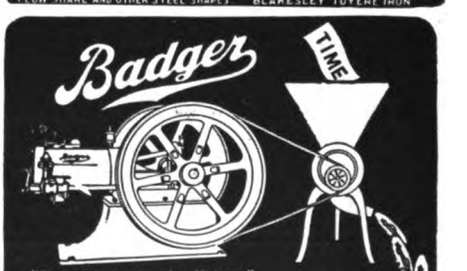
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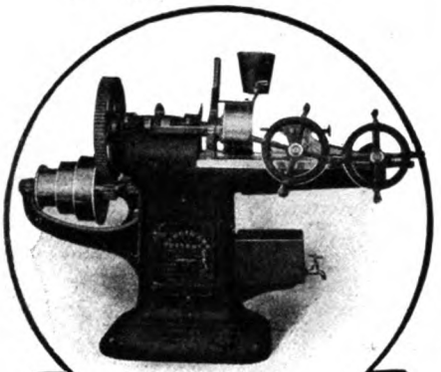
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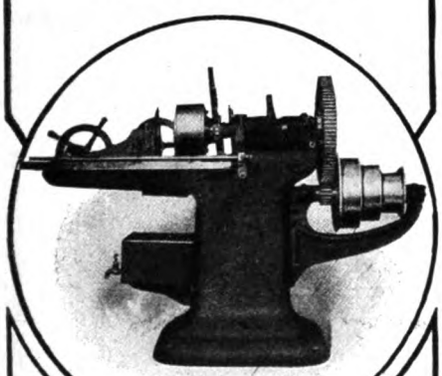
A Bolt Cutter is much like a man in this: THE HEAD is nearly everything.

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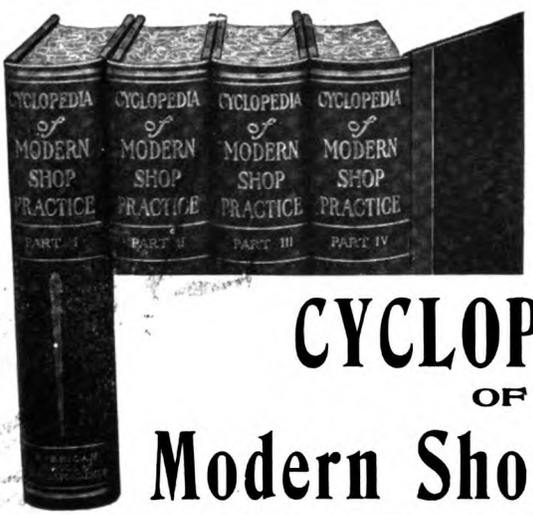
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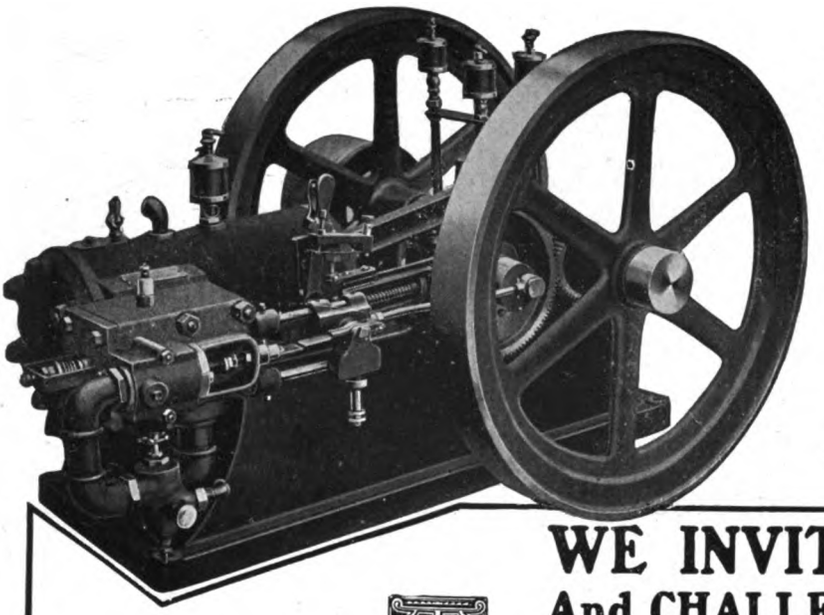


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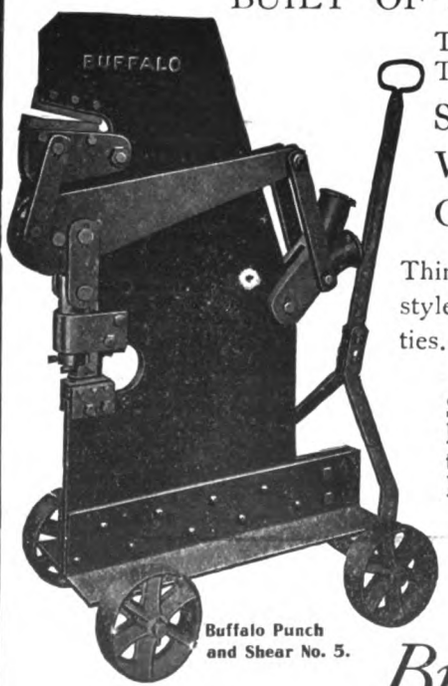
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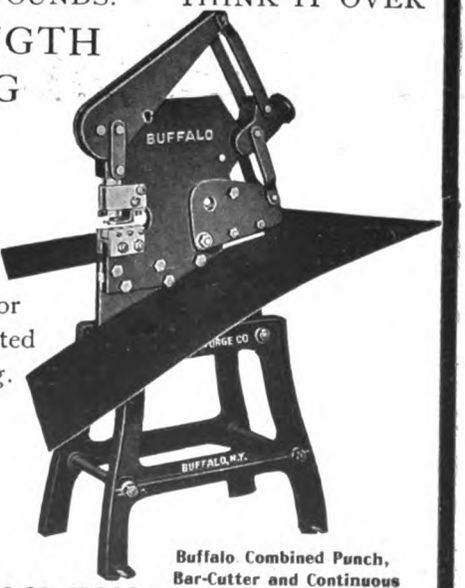
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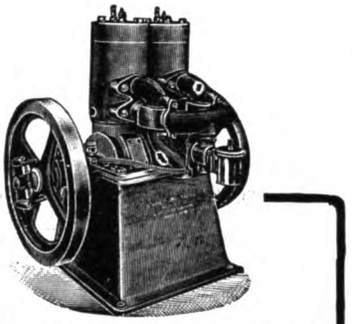
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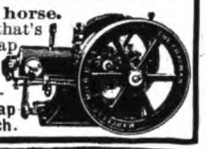
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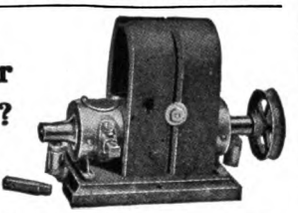




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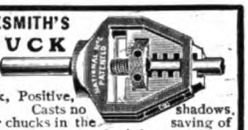
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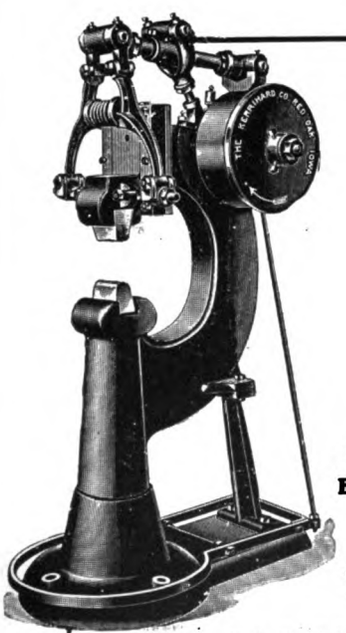
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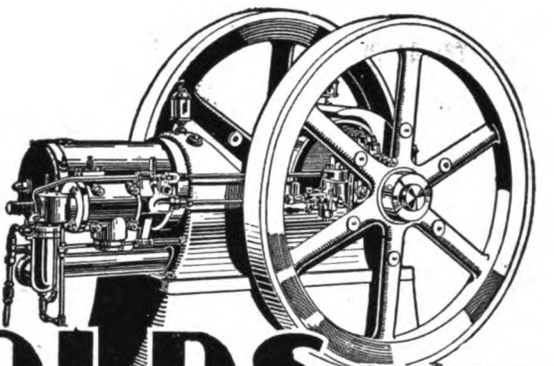
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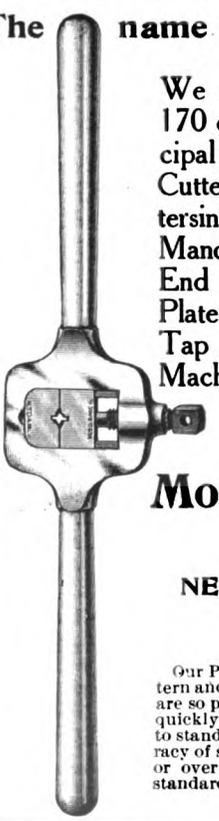
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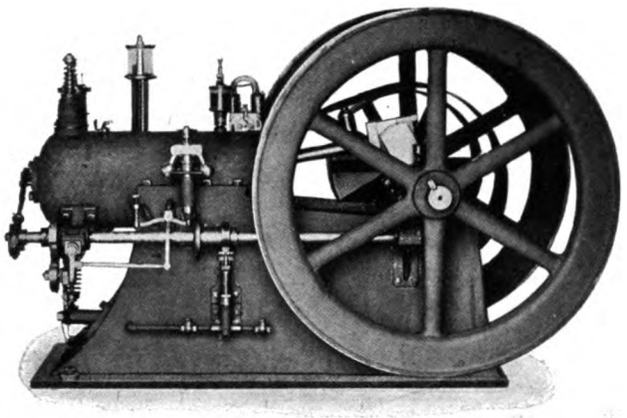
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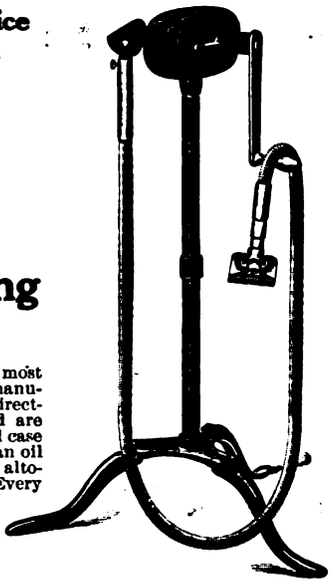
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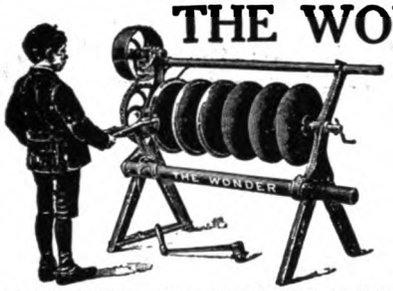
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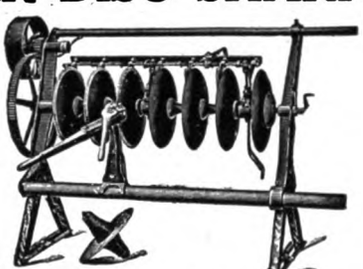
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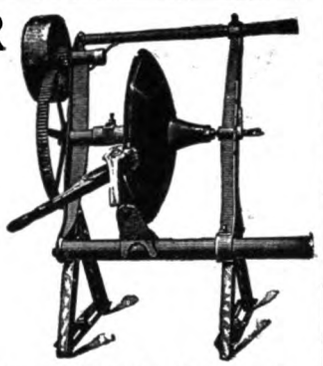
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The above cut shows the LITTLE GIANT at work on a whole section of Discs. This machine is especially adapted for sharpening Disc Harrows.



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IOWA—A. E. Durner: I bought one of your Wonder Disc Sharpeners last spring, and can truly say that it is the best machine I have ever used for sharpening discs. Yours truly.
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SOUTH DAKOTA—A. E. Durner: I bought one of your Wonder Disc Sharpeners and found it O. K. and would advise any blacksmith in need of a Disc Sharpener by all means buy the Wonder as they will surely be satisfied.
Yours truly, J. W. IMPECOVEN, Kidder, S. Dak.

TEXAS—Dear Sir: I wish to say that the Wonder Disc Sharpener I bought this spring is O. K. It works well and is well worth the price. I am well pleased with it. Resp'y. A. F. BALL.

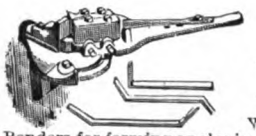
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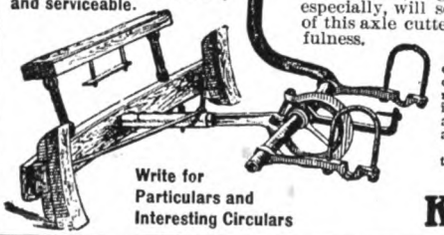
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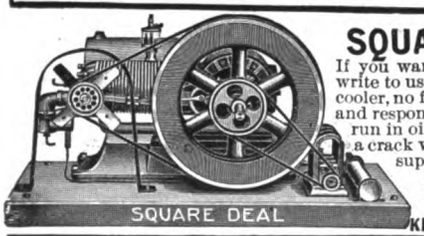


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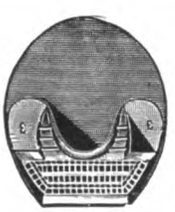
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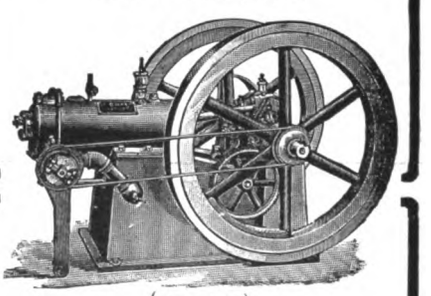
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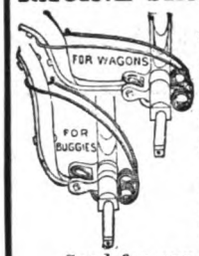
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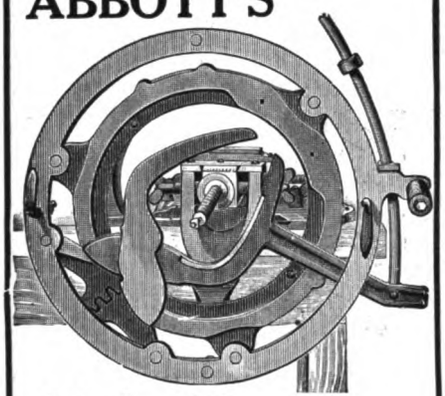


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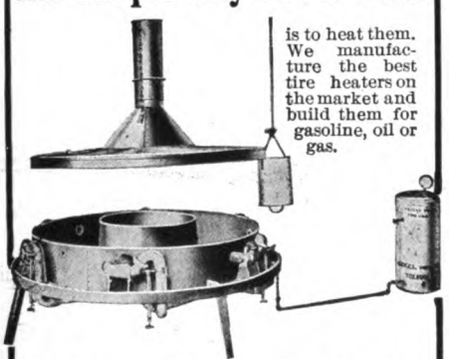


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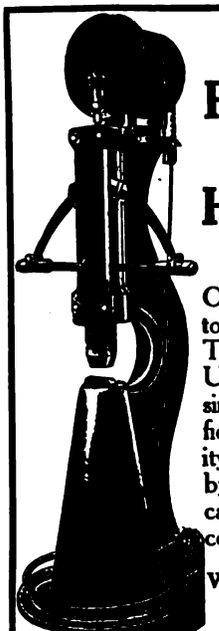
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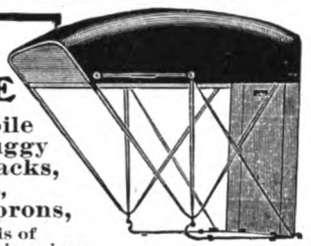
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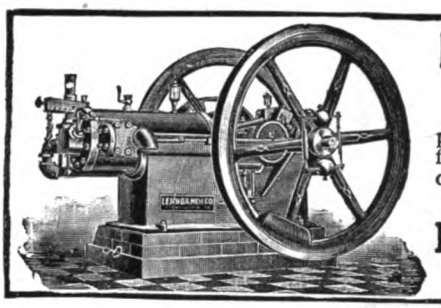


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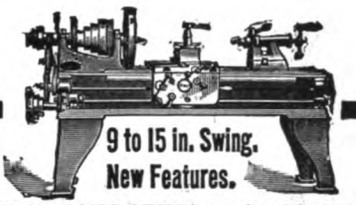


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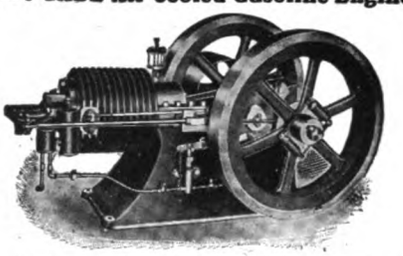
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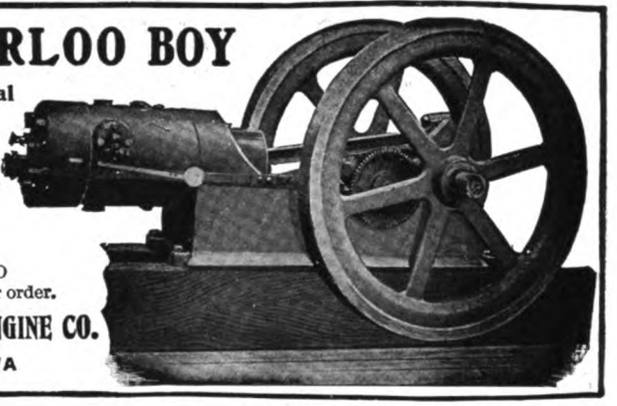


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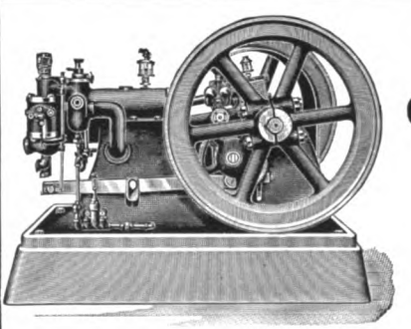


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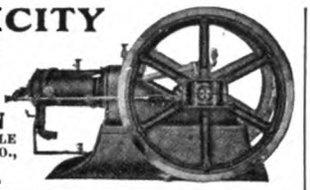
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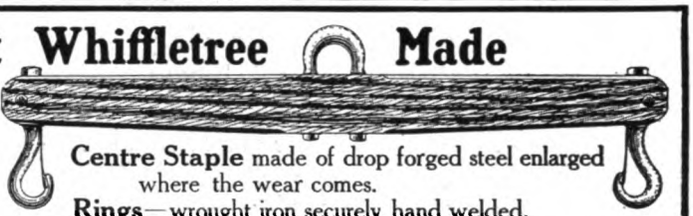
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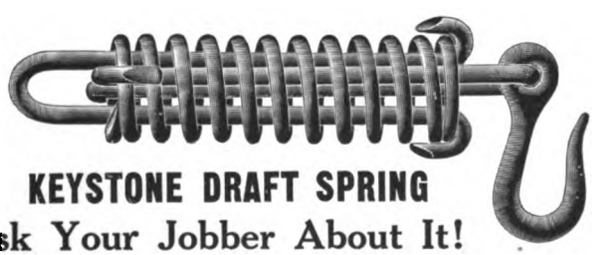
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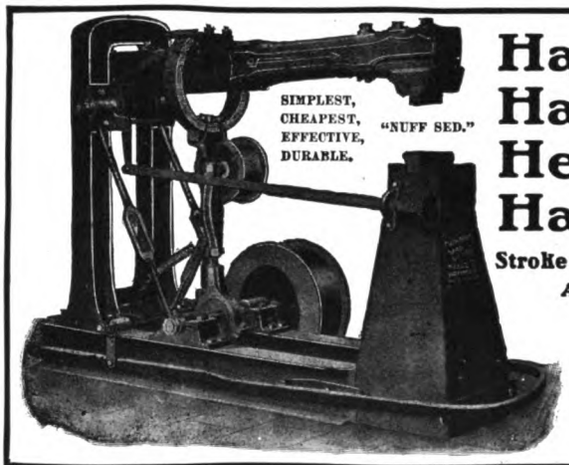
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Hathorn's Hard-hitting Helve Hammer.

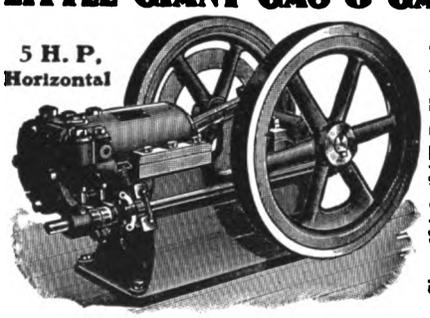
Stroke adjustable while running.

Ask your Dealer or write to

HATHORN FOUNDRY & MACHINE CO.
1206 N. 71st Ave.
CHICAGO, ILL.
Mont Clare Station.

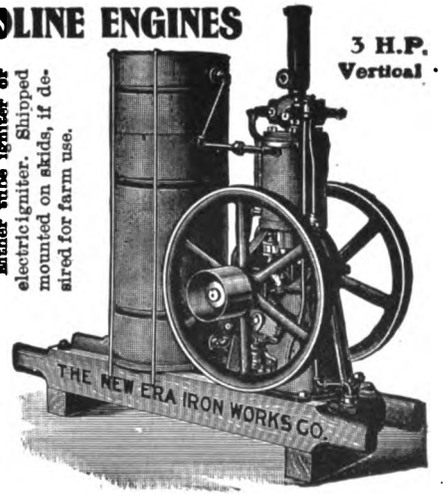
LITTLE GIANT GAS & GASOLINE ENGINES

5 H.P. Horizontal



Sizes, 1½, 3, 4½ H. P. Vertical, 5 to 25 H. P. Horizontal. Either tube igniter or electric igniter. Shipped mounted on skids, if desired for farm use.

3 H.P. Vertical



Also equipped with pumping attachments. Write for booklet describing full line New Era Gas Engines from 8 to 100 H. P. Special inducements to dealers as agents.

THE NEW ERA GAS ENGINE CO.
No. 63 Dale Ave., DAYTON, OHIO.

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WEBER GAS GASOLINE ALCOHOL ENGINES

Are specially fitted to the requirements of Blacksmiths and Wheelwrights

SIMPLE——DURABLE——DEPENDABLE

Today Weber Engines are operating machinery for Blacksmiths and Wheelwrights in each State and Territory in the Union, and in every civilized country on the globe.

BLUE MOUNTAIN, Miss.

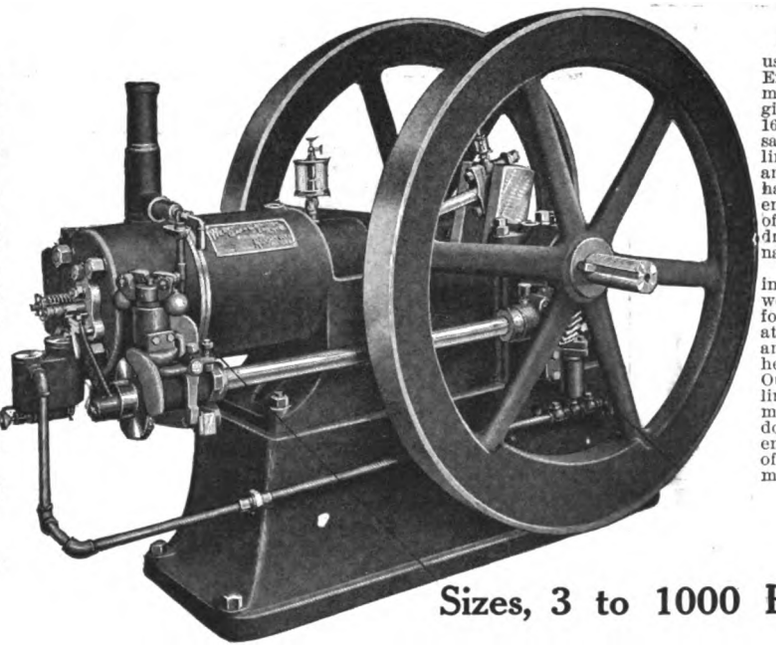
Gentlemen:—The 6 H. P. Gasoline Engine we bought of you two years ago is doing as good as the day we started it, and we have never had any trouble with it.

We are running a 16-inch swing double end wood lathe, a 14-inch Buhr corn mill, grinding for the public, a sash and cut-off saw, emery wheels, Champion Blacksmith drill press, Wood boring machine, grind stone, etc., and run nearly all at once with the engine.

We would not be without it, in fact, don't see how we could get along without it now. Can start our engine in a minute and do our work so much easier and quicker, and it costs nothing when engine is standing still.

Would recommend Weber Engines to those needing power.

Very truly yours,
M. WINBORN & SON.



MURRAY, UTAH.

Gentlemen;—We have been using one of your 3 H. P. Engines about twenty-four months, and in that time have given it a fair trial. We run a 16-inch blower, 30-inch band saw, 12-inch circular saw, drilling machine, turning lathe and emery grinder. We also have a pump connected with engine by cable at a distance of 280 feet from the engine and draw water for stock and culinary purposes.

We do general blacksmithing, wagon and carriage work, wood turning, etc., and run four of our heaviest machines at once without any trouble and apparently not a very heavy load for the engine. Our expense outside of gasoline and oil during the 24 months has not exceeded one dollar all told. We like the engine very much on account of its simplicity and ease of management.

Yours truly,
A. M. PALMER & SONS.

Sizes, 3 to 1000 Horse Power.

HONEST FACTS ABOUT HONEST ENGINES

¶ WEBER ENGINES are made of the best obtainable class of material, regardless of cost, and by high priced skilled mechanics who have spent years learning their trade.

¶ Every engine is critically tested under full and partial load before shipment, and full actual horse power guaranteed.

¶ Crank shafts cut from solid billet of steel without a bend or weld. Connecting-rods heavy and strong, with double adjustable bearings.

¶ Governor extremely sensitive and arranged so that speed of engine can be instantly changed without stopping—saving time and labor.

¶ Ignitor simple and positive in action. Sparking points noncorroding, rust proof and self-cleaning.

Write for catalog describing engines in detail, and tell us the amount of power you need. We will quote you promptly and give your letter our personal attention.

HIGHEST AWARD
ESTABLISHED 1884
PRODUCER
WEBER
GAS GASOLINE ENGINES AND HOISTS
GOLD MEDAL

WEBER GAS ENGINE CO.

Box 400.

KANSAS CITY, MO.

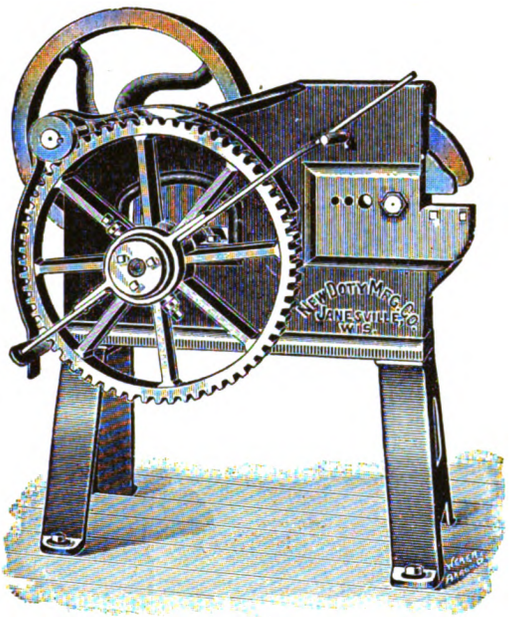
Catalog free.

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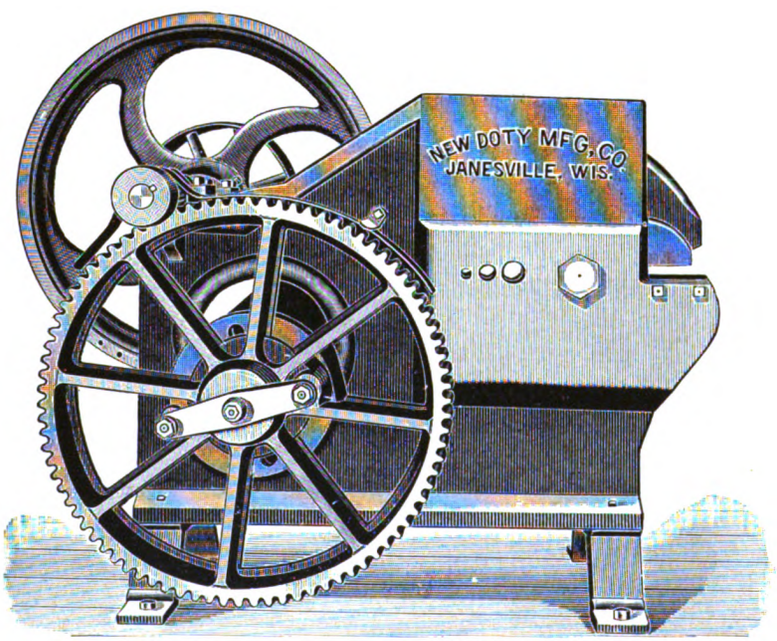
New Doty Punches and Shears

No. 7 Series Alligator Shears

MADE IN
SIX SIZES



THESE machines are very strong and powerful. The knives for flat and round iron are independent of each other, and are always ready for use. The round iron knives are made the reverse of the iron and so do not flatten it in cutting.



THE eccentric is of such a shape that there is a slight pause after each stroke to allow the operator to adjust the metal for the next stroke.

---Manufactured by---

THE NEW DOTY MFG. CO.

JANESVILLE, WIS.

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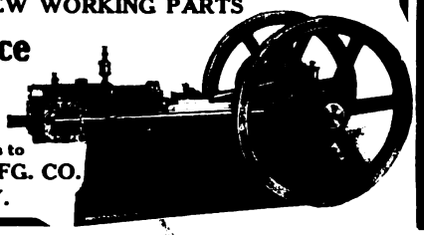


TWO RECOGNIZED LEADERS

In the Gas Engine Line

ALWAYS RELIABLE
MOST ECONOMICAL ON FUEL
SIMPLE IN OPERATION
FEW WORKING PARTS

And at a Price That any Smith Can Afford

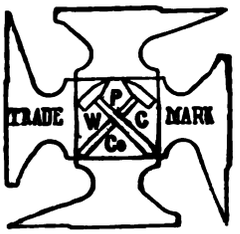


Write for Particulars to
THE ROBERTSON MFG. CO.
BUFFALO, N. Y.

YOU WILL NEVER FAIL

To Make a Strong, Clean Weld If You Use Perfection Welding Compound.

We invite you to give our Compound a thorough test, and will ship any amount to any address for that purpose. If it does not prove just as represented we pay all expenses.



Perfection Welding Compound will do the trick quickly and neatly. It makes a stronger weld than any other compound manufactured, as proven by the tests it has undergone. Send for free sample.

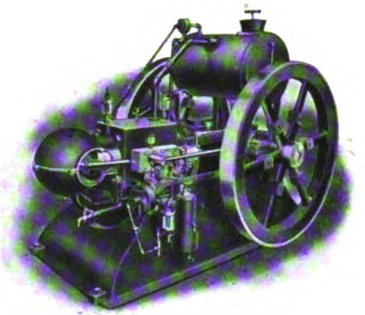
PRICE CONSISTENT WITH QUALITY.

PERFECTION WELDING COMPOUND CO., SCRANTON, PA.

If you will write us we will tell you how you can save on each fire $18.33 per year on your blacksmith coal bill.

BUFFALO FORGE COMPANY,
Buffalo, N. Y.

LIGHTNING GASOLINE ENGINES



Steam Cooled
Double Piston
No Foundation

Send for Catalogue Showing Superior Points, and get Prices

KANSAS CITY HAY PRESS CO. 482 Mill St., Kansas City, Mo.

INVESTIGATE THE

Hercules Hydraulic

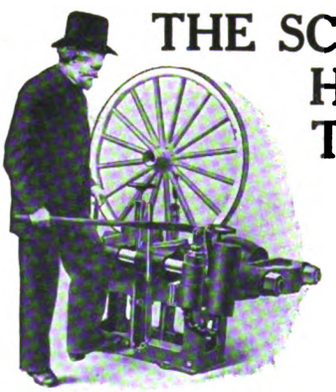
Before You Buy a Tire Setter



National Machine Co.

KEOKUK, IA.

THE SCIENTIFIC HYDRAULIC TIRE SETTER



IS WHAT YOU WANT.

WRITE TO
STANDARD TIRE SETTER CO.,
KEOKUK, IOWA.

HAY-BUDDEN SOLID WROUGHT ANVILS

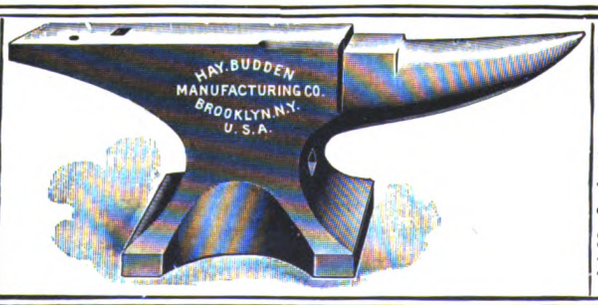
The Gold Medal Anvil

Highest Award

OMAHA, 1898 PAN-AMERICAN, 1901

Every Genuine "Hay-Budden" Anvil is made of the best *American Wrought Iron* and faced with best *Crucible Cast Steel.* Every genuine "Hay-Budden" Anvil is made by the latest improved methods.

WEIGHTS FROM 10 TO 800 LBS.



OVER 100,000 IN USE

WARRANTED

Experience has proved their worth and demonstrated that "HAY-BUDDEN" Anvils are Superior in Quality, Form and Finish to any on the Market.

HAY-BUDDEN MFG. CO., BROOKLYN, N. Y.

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VOLUME 6 NUMBER 6

THE AMERICAN BLACKSMITH

A Practical Journal of Blacksmithing and Wagonmaking

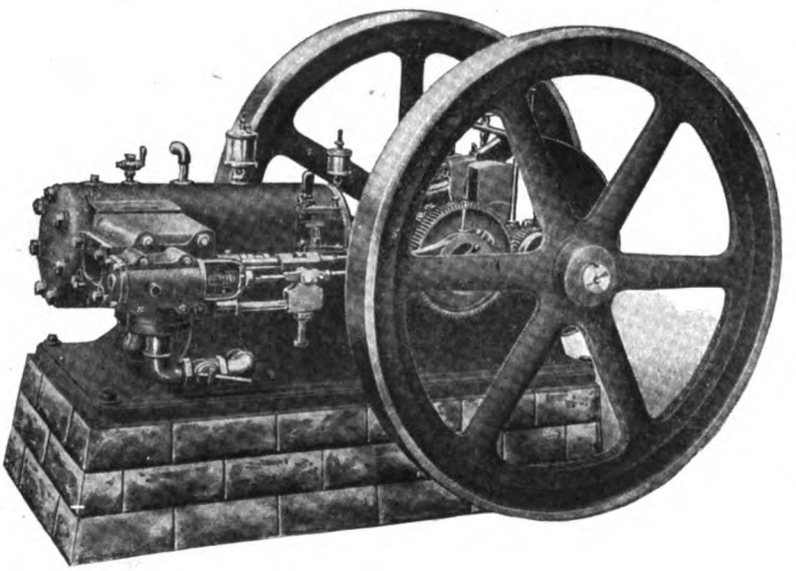
BUFFALO
N.Y. U.S.A.

MARCH, 1907

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GAS AND GASOLINE ENGINES

THE BEST AND SIMPLEST ENGINE.
WHY?



WRITE US FOR THE REASON WE WANT YOU FOR A CUSTOMER

Tell us what size power you can use
Our proposition will get your order if you want an Engine
RELIABLE AGENTS WANTED
WILLIAMSPORT GAS ENGINE Co.
WILLIAMSPORT, PA

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Tools You Should Have

IF you knew all about the many labor-saving tools that could be used in your shop, you could easily decide whether it would pay you to use any of them.

¶ Are you willing to graduate and be among those who "know"?

¶ You get more than pleasure and easy work from the use of good, modern tools—you get good profits in cold cash.

¶ Shall we mail you our illustrated descriptive booklets? That's what we printed them for.

¶ You will then find out the money-making possibilities in our modern improved machines. We haven't been mixing expert brains with the best material all these years for nothing.

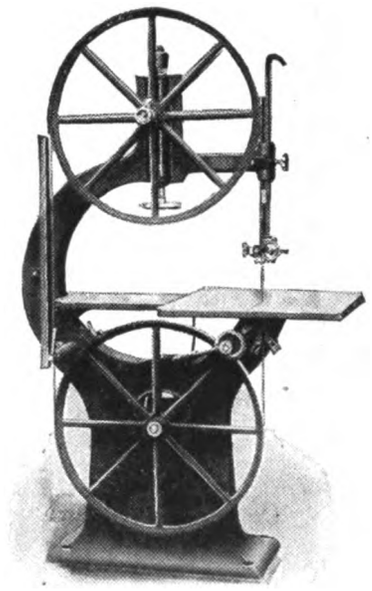
Sllver Manfg. Co.

365 Broadway,

Saiem, Ohio, U. S. A.

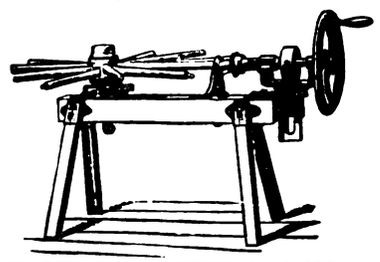
Improved Band Saws

Foot and belt power. New patterns throughout—rigid, symmetrical construction, new table tilting device, perfectly balanced wheels. Belt shifter, adjustment of upper wheel, saw guide, tension of saw blade, etc., all within easy reach of the operator. Sizes, 20 to 36 inches.



Spoke Tenon Machine

Dole and Deming's patent for hand and power; cuts tenons on spokes and does it perfectly. Its absolute accuracy adapts it to highest grade work.



Portable Forges

We make 14 kinds of Portable Forges. We have a size to suit your needs. Strong and durable. Attractive designs.



Fig. 901, with Shield.

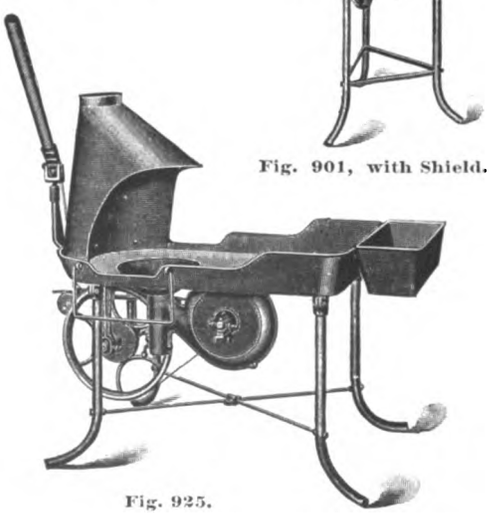
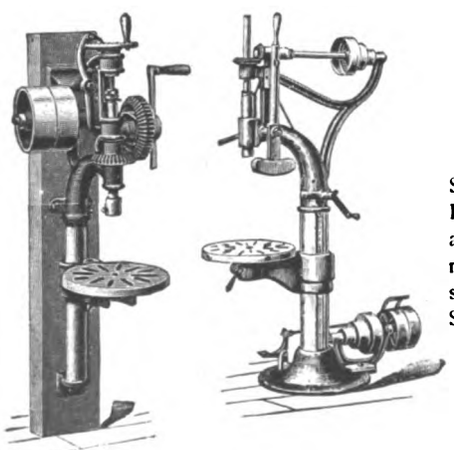


Fig. 925.



Drills

Swing, Post and Bench Drills for hand and power. Automatic feeding, new simple and efficient. Strong and durable.

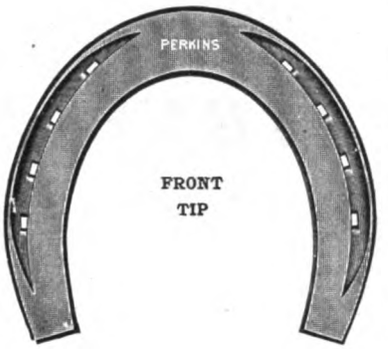


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HIND
LONG HEEL.

Look for this Trade Mark ★ The Star brand beats all others



FRONT
TIP



FRONT
LIGHT.



FRONT
TOE WEIGHT.

★PERKINS★
HORSE SHOES
AND
TOE CALKS
The **SUPERIOR** Kind

Have more points of superiority than any other make. An up-to-date shoe for up-to-date Blacksmiths.



HIND
SIDE WEIGHT.

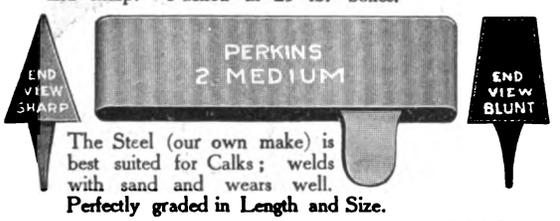
Perkins Shoes have given satisfaction wherever used. Our line is complete and every shoe guaranteed. Made in all styles and sizes. Send for sample. New Pattern Front Extra Light and Light. Free for the asking. We will gladly send

COMPLETE CATALOGUE AND SAMPLES FREE.

WRITE TODAY.

PERKINS

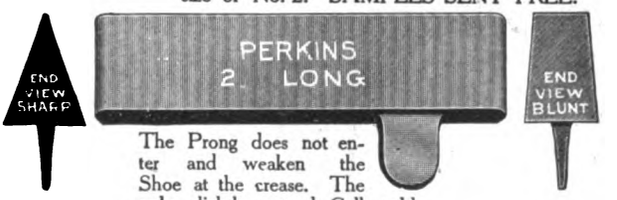
Made in Medium and Long, both blunt and sharp. Packed in 25 lb. boxes.



The Steel (our own make) is best suited for Calks; welds with sand and wears well.
Perfectly graded in Length and Size.

TOE CALKS

Chisel Pointed Prong. These cuts show exact size of No. 2. SAMPLES SENT FREE.



The Prong does not enter and weaken the Shoe at the crease. The only slightly curved Calk sold.

MANUFACTURED BY

RHODE ISLAND PERKINS HORSE SHOE COMPANY
PROVIDENCE, RHODE ISLAND.

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PRAIRIE—CALKED.



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FRONT
LIGHT
IRON.

Phoenix

HORSE AND MULE SHOES

are manufactured under most careful inspection—our object being to produce the most perfect shoes possible, giving you highest quality in both material and workmanship. *Your customers will appreciate our shoes.* Made in all styles. Write for descriptive booklet.

PHOENIX HORSE SHOE CO.,
CHICAGO, ILL.

Rolling Mills, Poughkeepsie, N. Y.
and Joliet, Ill.



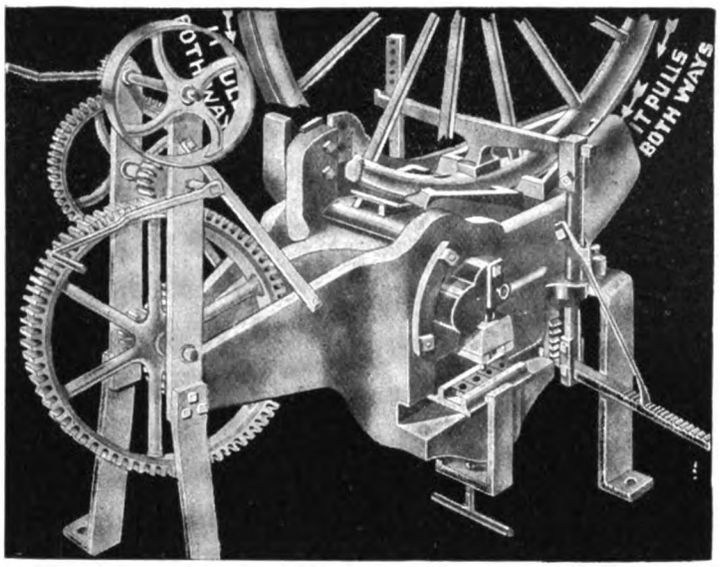
PHOENIX
FRONT
COUNTERSUNK.



PHOENIX
E. E. L. STEEL
HIND.

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THE HOUSE COLD TIRE SETTER



IS A SUCCESS,

But as some others have misstated facts, we furnish the following proofs to show that what we say is true.

UNCLE SAM HAS ADOPTED OUR MACHINE

and the following testimonial proves it:

January 21, '07.

House Cold Tire Setter Co., St. Louis, Mo.

Dear Sirs—We have had one of your machines at work in the blacksmith shop at this post for three months and it has been an unqualified success. We have used it on tires from light buggy size up to four-inch tires. It is at once a great labor and time saver. Besides it does a better class of work.

Yours truly,
D. W. KILBURN, Capt. and Q. M., 26th Infantry,
Fort Sam Houston, Texas.

One other strong proof is that we have 700 of our machines in use in Texas, our native state, while our competitors altogether have practically none in the State.

You can own a "House" if you like, and it will cost you less than the price of three days work. The proof is, it sets a tire in five minutes and thus sets $6.00 worth per hour. Count up the hours when you have taken in the price of the machine and see for yourself, and remember you get our $80.00 punch and shear free.

This is a Cut of Our No. 1 Machine, which sets all size tires up to 2 by ¾ inches and shears ⅝ by 3 flat iron and ⅞ round, and punches holes up to ½ inch, and does it almost as fast as you can count. Can be changed from one size hole to the other in two seconds.

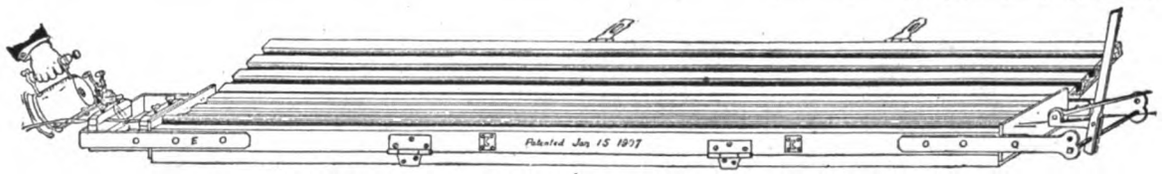
Our No. 3 machine has both hand and power attachment. Sets all ordinary tires up to 1 by 4½ inches, and shears 1¼ by 5 flat, 1¾ round. Also cuts all axles up to 1½ square, and will punch any size up to ¾ holes. Adjustment same as No. 1.

HOUSE COLD TIRE SETTER CO.

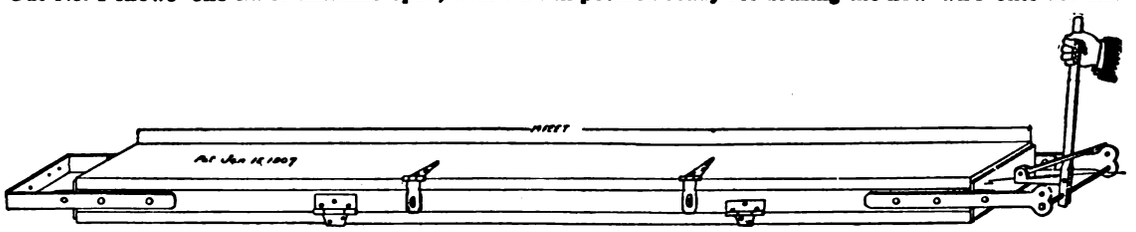
OFFICE AND FACTORY
216-220 So. Third St., ST. LOUIS, MO., U. S. A.
No. 40 Church St., Toronto, Ont., Can.

NO MORE CUSSING.

HERE is what you have been looking for! Will extract any wire and insert a new one at the same time. The latest machine out for rubber tire work.



Cut No. 1 shows one lid of machine open, with wire in position ready for brazing the new wire onto the old.



Cut No. 2 shows lid closed with wire grip attaceed ready for drawing old wire, and at the same time inserting the new one.

Machine is made for six sizes of tires, from three-fourths to one and one-half inches. Machine for larger sizes can be furnished upon application.

MACHINES GUARANTEED AND SOLD ON APPROVAL.

JAMES HART & CO., M'f'rs,

WASHINGTON, PA.

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The Hoof Pad Business Belongs to the Shoer Who Teases it Most.

Have you ever noticed that there is a heap sight of difference between handling "all the business that comes to you" and in going after all the business to be had.

☞ It's the go-after fellow who gets the trade to come to him —especially in the pad line.

By the aid of

Morgan & Wright Pads

and a little push, hundreds of shoers are today securing a monthly income that would make the "don't-care-much" fellow sit way up and take notice if he could see it.

The principal value of Morgan & Wright pads (as any shoer who has used them can tell you) lies in the fact that they back up all the good things you can say to your customer about the worth of pads to his horse.

Get a trial order and test them for yourself.

A pad for every purpose—17 in all.

Easy to fit. Run larger than other brands.

MORGAN & WRIGHT, Detroit

Chicago, New York, Boston, Dayton, Detroit,
St. Louis, San Francisco, Atlanta.





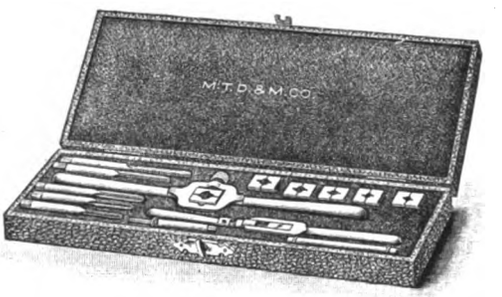
INCREASE AND CONSTANT ANGLE TWIST DRILLS, REAMERS, CHUCKS, MILLING CUTTERS, TAPS, DIES, MACHINERY AND MACHINISTS' TOOLS.



Morse Twist Drill & Machine Company,

NEW BEDFORD, MASS., U. S. A.

Anything that is marked "MORSE" or "M. T. D. & M. Co." is safe to buy.



No. 1 Set in Morocco Case.
The set complete with 6 pairs of dies, 6 Taps, and Tap Wrench, in morocco case, 1/8 to 1/4 inch.

A GREAT OPPORTUNITY

DON'T MISS IT

WE

HAVE

A

Special Proposition

FOR EVERYBODY

WHO DOES

CARRIAGE OR WAGON PAINTING

Write for particulars to

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29 BROADWAY, NEW YORK — 2620 ARMOUR AVE., CHICAGO

LONDON BERLIN BRUSSELS

Be sure to address DEPT. P for this special offer

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Buffalo 200 Blower

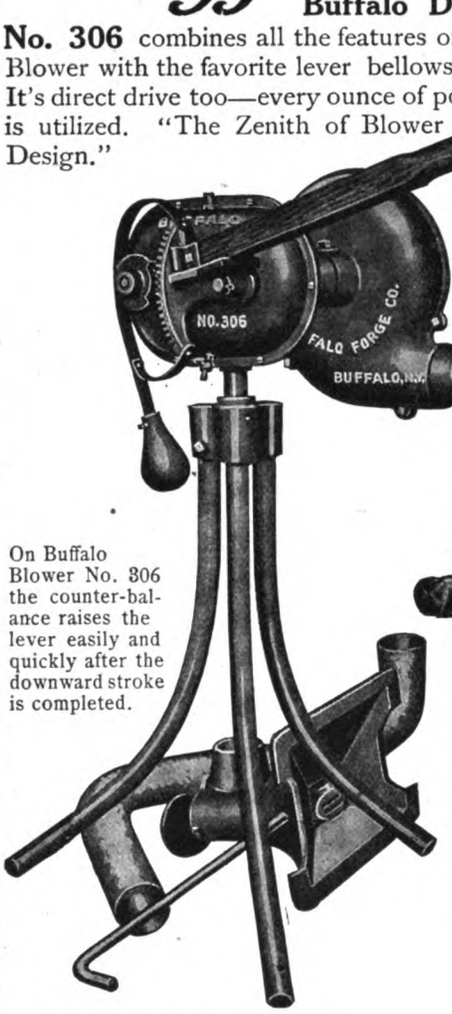
Buffalo Direct Drive Blower

No. 306 combines all the features of Buffalo No. 200 Blower with the favorite lever bellows motion. It's direct drive too—every ounce of power is utilized. "The Zenith of Blower Design."

GUARANTEED FOR FIVE YEARS

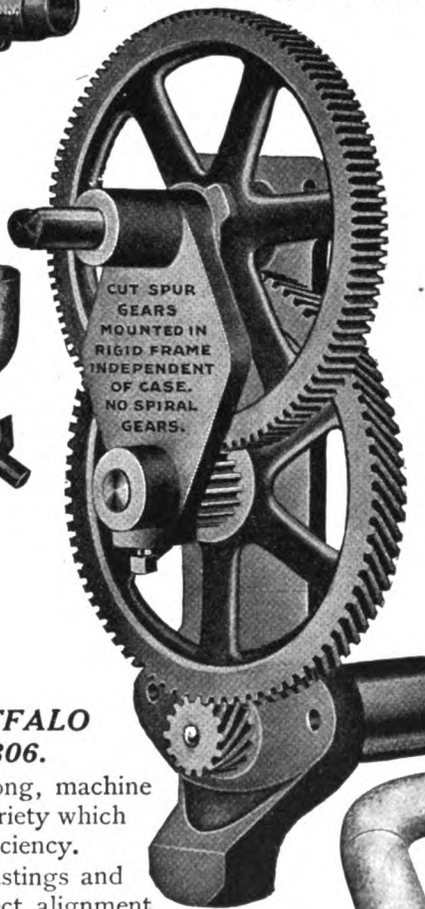
GUARANTEED FOR FIVE YEARS

Buffalo Nos. 200 and 306 Geared Hand Blowers are guaranteed to outwear any others on the market and to produce a stronger blast with less effort than any other blower built. Any parts wearing out in five years will be replaced free of charge.

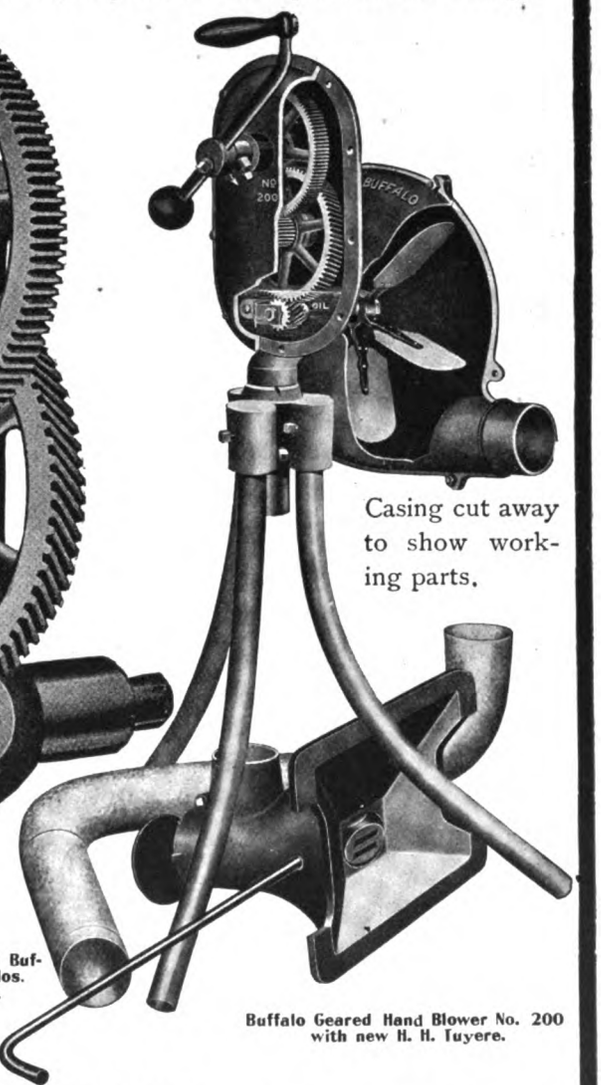


On Buffalo Blower No. 306 the counter-balance raises the lever easily and quickly after the downward stroke is completed.

Buffalo Direct Drive Blower No. 306 with new H. H. Tuyere.



Gearing used on Buffalo Blowers Nos. 200 and 306.



Casing cut away to show working parts.

Buffalo Geared Hand Blower No. 200 with new H. H. Tuyere.

TELLING POINTS OF BUFFALO BLOWERS NOS. 200 and 306.

Gears—Heavy, with large, strong, machine cut teeth, cut spur and helical variety which reduces friction and increases efficiency.

Bearings—Bored from solid castings and reamed to gauge, ensuring perfect alignment and easy, silent running.

Oiling—Gears constantly run in oil, keeping the working parts perfectly lubricated.

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Sold by Best Dealers Throughout Entire World.

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Buffalo, N.Y.

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TO THE BLACKSMITH.



The Williams Drop Forging Co., realizing a long felt want, have finally perfected a Summer Shoe for all road horse purposes, or Speedway use, which, though light in weight, is, on account of the superior quality of material from which it is made, possessed of much greater wearing properties than any of the old style heavy weight shoes, yet they are so perfect and symmetrically formed that they will satisfy the sharpest critic; and, as they are drop forged, every shoe of a necessity will be exactly the same as another of the same kind and size. Something new, which will prove itself your friend, because it will enable you to do higher class work at easier prices. It will, therefore, prove a friend to the consumer or horse-owner, but its benefits will, essentially and particularly, be for the horse for many reasons, possibly the greatest of which is because he will be shod absolutely right and identically the same every time.

Given every facility for that class of work, some of you might be able to turn out such a shoe. We will leave that for the decision of your good selves, but we are positive that they all will agree that you could not make them profitably at a cost ***double*** the ***price*** at which these will be sold.

The shoe will be handled by all the leading jobbers of blacksmith supplies throughout the United States so far as it is possible, and we will supply direct from the factory all blacksmiths in localities where no agencies are established.

All requests for information regarding these shoes will be cheerfully and promptly replied to by

BITTENBENDER & CO.,

SOLE DISTRIBUTORS,

126-128-130-132 Franklin Ave.,

Scranton, - Pa.

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"QUICK ACTION"
IGNITING DYNAMOS
Excel all others!

The only generator that cannot lose its magnetism. For either make and break or jump spark work. Also spark coils. Send for Catalogue B.

The Knoblock-Heideman Mfg. Co.,
SOUTH BEND, IND.

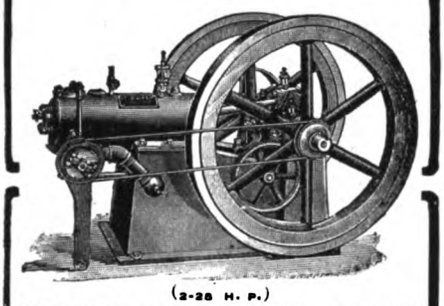
HAUSAUER-JONES PRINTING COMPANY

PRINTERS, ENGRAVERS
BOOK BINDERS

253-257 Ellicott Street, Buffalo, N. Y.

Printers of THE AMERICAN BLACKSMITH, also Complete Equipment for the production of Machinery Catalogues, Stock Farm Catalogues, College Annuals and Catalogues in Foreign Languages, promptly, accurately and tastefully : : : : : : : : : : :

HAGEN
GAS AND GASOLINE ENGINES



(2-25 H. P.)

ECONOMICAL and RELIABLE POWER FOR THE SHOP-RUNNING BLACKSMITH and WAGON MAKER.

HAGEN ENGINES are recommended on account of their simplicity, durability, comparatively low price, small cost of operating and the ease and certainty with which they can be controlled.

Our Catalogue explains all working parts. A postal will bring a copy to you. It's free. Write today.

HAGEN
GAS ENGINE AND MFG. CO.
Winchester, Ky., U. S. A.

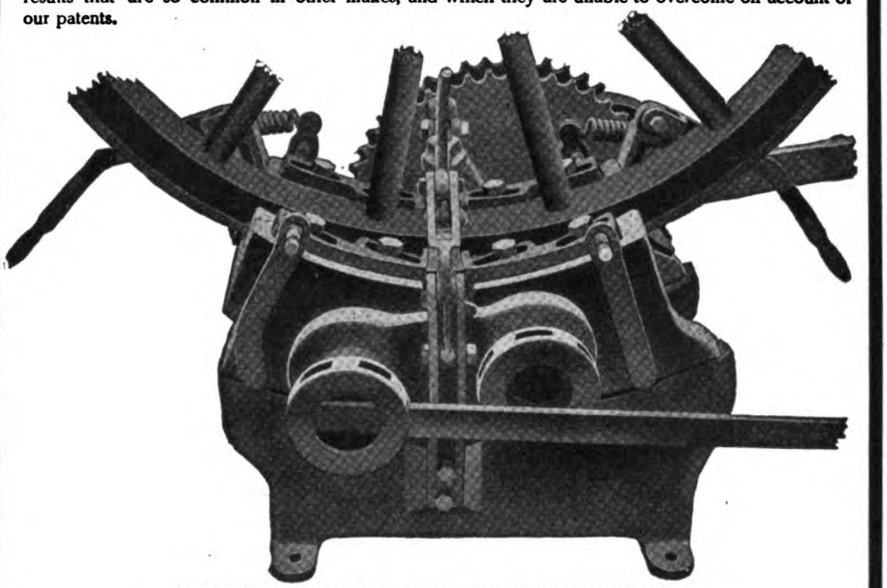
Uncle Sam's Expert Statement

to the Quartermaster General at Washington, D. C., referring to the **BROOKS COLD TIRE SETTER**, reads as follows:

> **" The Superintendent of Transportation and the Blacksmiths in this Department here, pronounce it the best machine for the purpose, giving perfect satisfaction on all the different tires we have in use."**

While it is true they have used others the above is their decision in which they pronounce the BROOKS the **best machine** for the purpose, giving **perfect satisfaction** on all the different tires they have in use.

Get a Brooks, if you want a machine that will give you perfect satisfaction; one that will bring you the tire setting from any otherwise (so-called) competitive cold tire setter, because it does the work right, without the chance of kinking the tire or bending it edgewise, and other dissatisfactory results that are so common in other makes, and which they are unable to overcome on account of our patents.



LATERAL, OR SIDE MOVEMENT

of the Draw Heads is necessary so they may line up with the tire and not bend it edgewise, should one grip key be ahead of the other. **The Brooks is the only machine having this feature.** Our gripping machine prevents the keys from slipping on the edge of the tire and bending it edgewise or kinking it. Our guide ways on the base, prevent the Draw Heads raising up and kinking the tire or flattening it. The above are a few of the many improvements found only in the Brooks and which overcome the imperfect way in which other machines do their work. The Brooks is the only complete and practical cold tire setter on the market as established by the best authority and the thousands of blacksmiths who are using them. The best is the cheapest, and you will agree with us that the Brooks has no practical competition, after using it.

Our descriptive Booklet, easy terms and a Handy Vest Pocket Memorandum Book sent you for the asking.

THE BROOKS TIRE MACHINE CO.
121 N. Water St. WICHITA, KANSAS.

Scott's IXL ALL High Speed Steel

Will cut at least one speed faster than any other high speed steel on the market.

Write for Catalog covering entire line of SCOTT TOOL STEELS.

THE BOURNE-FULLER CO., Cleveland, O.

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The Easiest Nails to Drive
AND
The Most Economical

THEY DO NOT CRIMP IN THE HARDEST HOOF



THEY RUN MORE NAILS TO THE POUND

ANNOUNCEMENT

Our 1907 Calendar, printed in seven colors on a card 10 by 14 inches, will be sent postpaid to any part of the world upon receipt of request.

THE CAPEWELL HORSE NAIL CO.
HARTFORD, CONN.

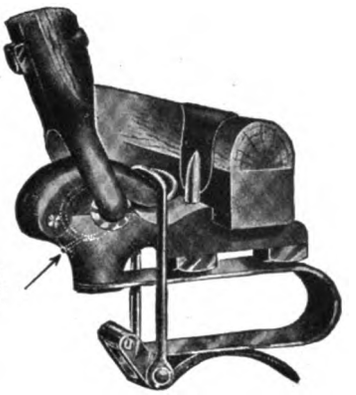
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ECCLES BALL-BEARING COUPLINGS

With Leather Bushings in one piece, securely fastened in the socket of the Coupling.

When the shafts are removed, the bushing does not come out, but stays in the Coupling where it belongs. NO LOST BUSHINGS WHEN YOU USE OUR COUPLINGS.

We would like to send you our circular and have you try our Couplings. They will save you money.



See the Clinch

Pat. applied for

The Spring is pivoted at the front so that it can be turned forward out of the way of the wrench while clipping the Coupling to the axle.

These are two of the good points, but there are plenty more desirable features in our Couplings.

Patented Nov. 25, 1902.

We also have a Catalog showing our full line of **Carriage and Wagon Forgings** all of which we make.

RICHARD ECCLES CO., Auburn, N. Y.

THE BEST TOOL ON EARTH

For a Horse Shoer

Price, $1.75 Each

By Express Charges Paid to any point in United States



THE IMPROVED EASY HOOF TRIMMER

DIMENSIONS.—Weight, 2 lbs., Length, 12 ins., Opens 2 ins., Cuts 1 in. **OUR GUARANTEE.**—If you don't like it you can return it and get your money. **Directions for Using.**—First—Hold the foot in the ordinary manner and remove soft parts from bottom with your toe knife; then with the trimmer begin at the heel and cut down and around the toe and back on the other side, removing the part at one cut and in one piece. Second.—Avoid all wrenching or prying. Hold the tool as near upright as you can. Cut straight through to the blank jaw regardless of nails or other obstructions, and with very little leveling with the knife or rasp your job is complete.

THIS TOOL has been rightly named because it is EASY to adjust, EASY to sharpen, and EASY to convince a horse shoer that it will cut a hoof down easier, quicker and better than any tool he ever saw.

It has a detachable knife that can be removed or replaced in a moment. The knife jaw is adjustable by means of screws. When the knife becomes shorter by sharpening, give the screw a turn or so and the reins will go back to the proper distance apart. When knife wears out it can be replaced for a few pence.

CAUTION.—Don't make the mistake that a great many do by grinding bevel on one side of blade, but keep the bevel equal on both sides, so that it will pass through the hoof straight and not in a strain.

Follow above directions and you will soon learn to use THE BEST HOOF TRIMMER ON EARTH.

MADE BY

MUNCIE WHEEL & JOBBING CO.

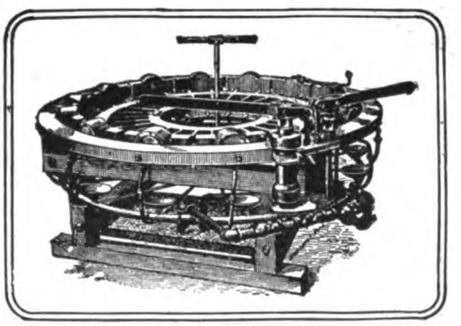
MUNCIE, IND.

Sole Wholesale Agents for British Isles:

THE IRON AND HARDWARE CO., LD.

Gloucester, England

The West Hydraulic Tire Setter



Is a **Round Machine** for tiring **Round Wheels,** and compresses the tire at all points—not all in one spot—and the compression is so slight at any particular point that tire bolts do not have to be removed when resetting an old tire, neither are holes closed so bolts are tight in tire. Wheel is made compact and joints tight.

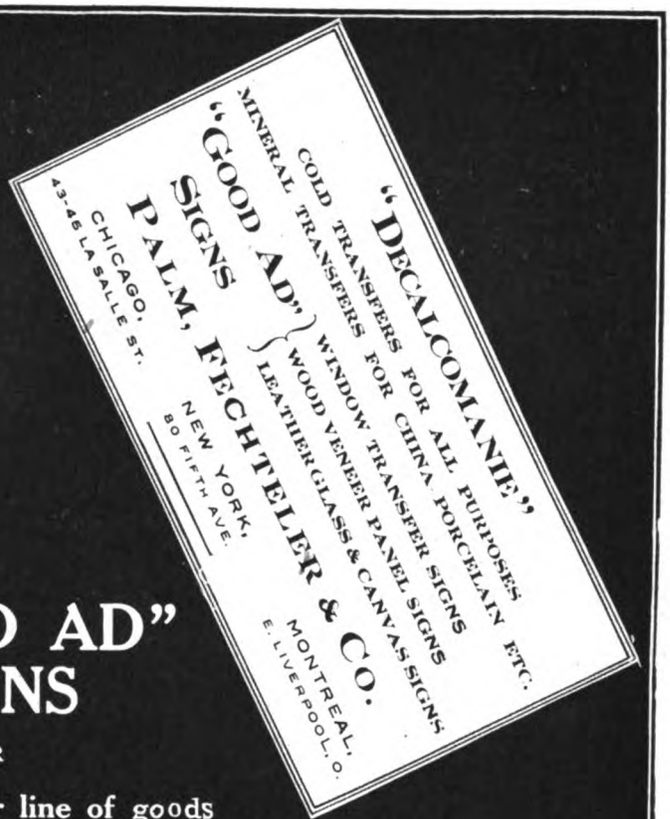
WRITE US YOUR REQUIREMENTS.

The West Tire Setter Company

ROCHESTER, N. Y.

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"GOOD AD" SIGNS

FOR

Advertising your line of goods to your agents and customers

WINDOWS AND DOORS, SHOW CASES, ETC.

REGULAR TRANSFERS

FOR

Decorating, Lettering and Numbering any job you have to do.

SPECIAL DESIGNS

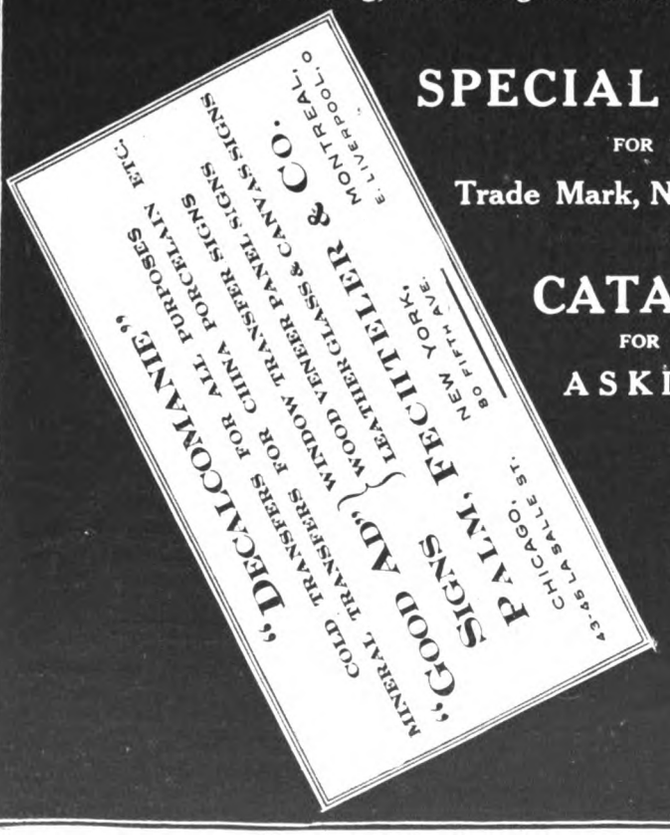
FOR YOUR

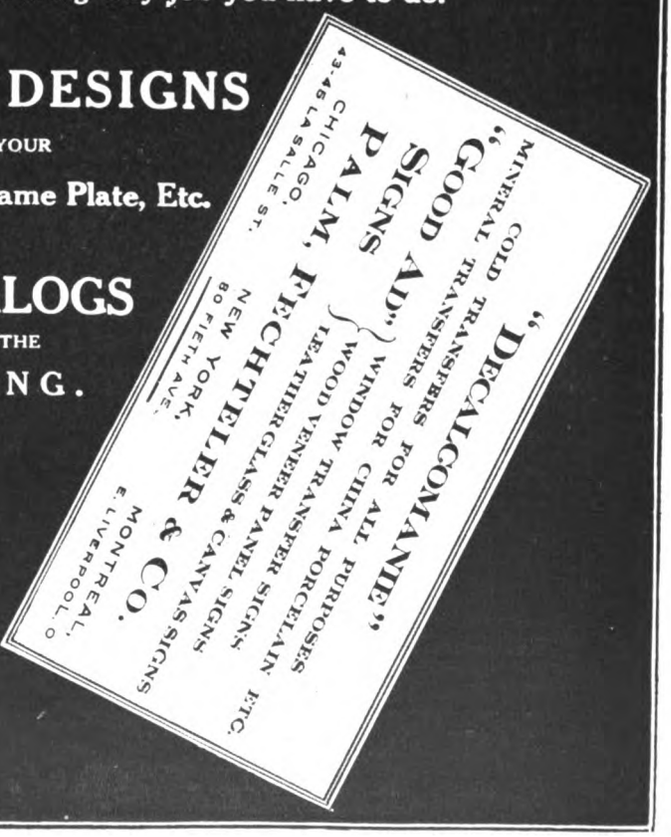
Trade Mark, Name Plate, Etc.

CATALOGS

FOR THE

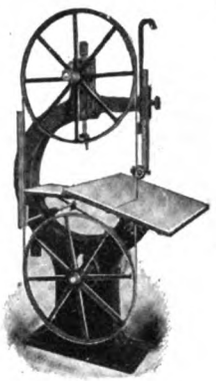
ASKING.

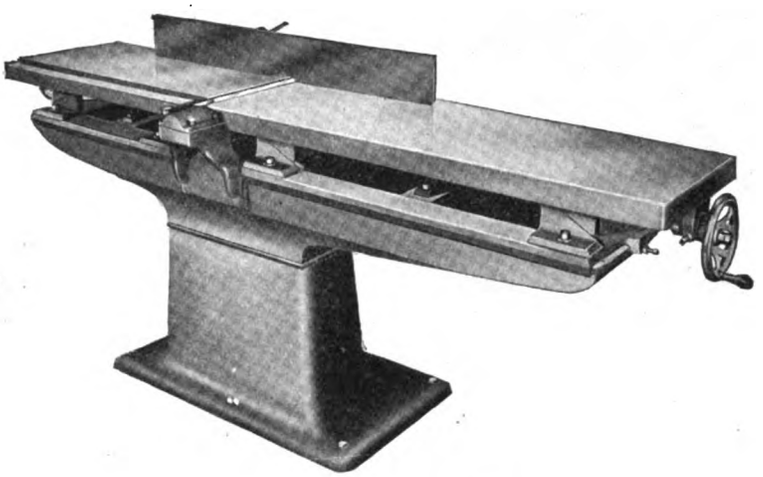


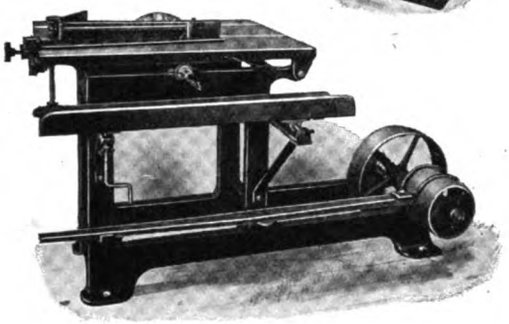


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Band Saws
Cut off Saws
Swing Saws
Rip Saws
Jointers
Lathes





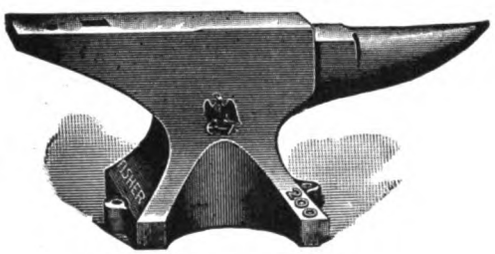


TAKE NOTICE.

If you are in the market for high grade wood working machinery, at very moderate prices, and designed especially to meet the requirements of blacksmiths and wagon makers, write us for our 1907 catalogue.

The Sidney Tool Co., Sidney, O.

"EAGLE"



ANVILS.

1843 **1907**

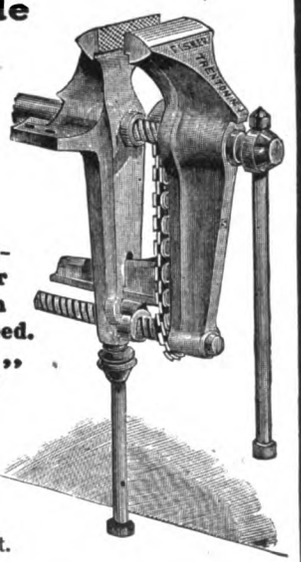
PIONEERS

IN THE MANUFACTURE OF

ANVILS AND VISES OF QUALITY

"Fisher" Double Screw Parallel Leg Vise

Is sold by Reliable Dealers Everywhere. For Strength and Durability there are none better made. The "FISHER" is acknowledged the Best for Blacksmiths.



We have had over sixty years Experience in this line and offer you the most reliable Anvils on the Market. Every one Guaranteed.

WE BELONG TO NO TRUST--one blow on an "Eagle" anvil is worth two on any other anvil MADE

The Face Consists of a Single Piece of the Very Best Cast Steel Perfectly Welded and of the Hardest Temper. The Horn is made of Tough Untempered Steel and will neither Break nor Bend. All "Eagle" Anvils made with the Latest Fisher Patent Double Thick Steel on Both Edges of the Face. Made in all Shapes and Sizes up to 1300 lbs. Weight.

WRITE FOR INTERESTING CIRCULARS AND PRICE LIST. SENT FREE.

EAGLE ANVIL WORKS, TRENTON, NEW JERSEY.

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SOME POPULAR TOOLS

Royal Blower

"The Successful Blower"



Crank Turns Forward or Backward.

Noiseless and Easy to Operate

Gear case is oil-tight and dust-proof. Gears run in a continuous bath of oil.

Gears are Phosphor Bronze and Steel, flat and straight cut. No Spiral or Worm Gears.

Fire-pot is 8x9½x4 inches inside.

A powerful blast; lasting after blast

Fan, 12 inches. Height, 47 inches. Weight, 135 pounds.

Can be furnished to operate with the right arm, for left-handed smiths, when desired.



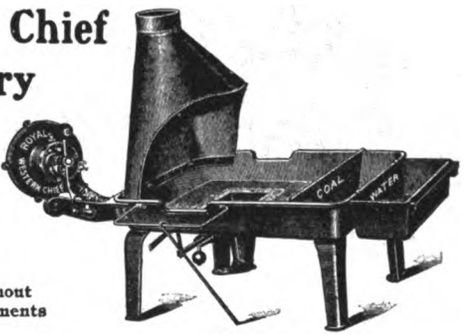
Royal (Western Chief) Forge No. 100

For use of Large Blacksmith, Wagon, Plow, Railroad Shops, Etc., where Heavy Work is Done, and a First-class Forge and Fire Are Needed.

Fan, 12 Inches.
Height, 30 Inches.
Weight, 300 Pounds.
Hearth, 31½ x 45½ Inches.
Length Over All, 53 Inches.

In this Forge we combine our "Royal" style of Blower with Western Chief Standard Hearth, having Solid Fire-pot with Tuyere Ball Furnishing side and center blast. We guarantee it fully.

Western Chief Stationary Forges



Six Different Styles

With or Without Blower Attachments



ROYAL FIRE-POT

Needs No Clay

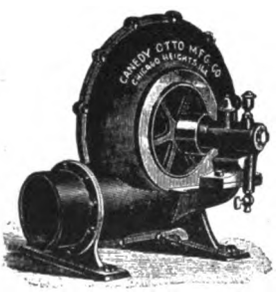
Dimensions 8 x 9¼ 4 inches inside

Tuyere Iron

Write for catalogue describing our full line of

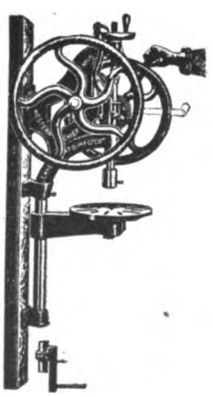
Forges, Blowers and Drills

For sale by first-class dealers all over the world.

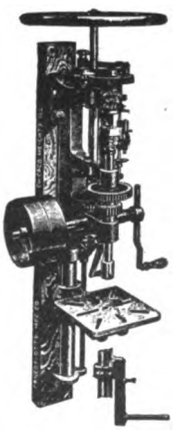


Western Chief Power Blowers

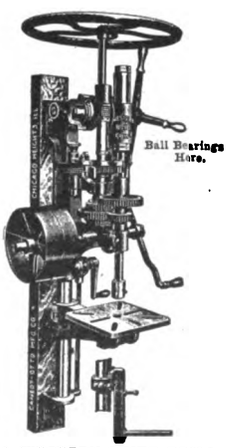
Built in sizes suitable for from one to seven fires



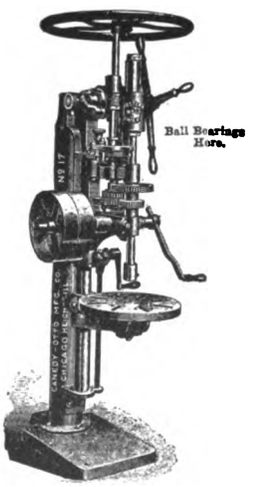
No. 15 WESTERN CHIEF DRILL.
Automatic Self-Feed.
19 in. Circle.



No. 14 WESTERN CHIEF DRILL.
Automatic Self-Feed, and the only AUTOMATIC Quick Return Post Drill Made. 21 in. Circle.



No. 16 WESTERN CHIEF DRILL.
Automatic Self-Feed and Hand Lever Feed. Largest Post Drill Made. 24 in. Circle.



No. 17 WESTERN CHIEF DRILL.
Automatic Self-Feed and Hand Lever Feed. 24 in. Circle.

MADE BY **CANEDY-OTTO MANUFACTURING CO.**

CHICAGO HEIGHTS, ILLINOIS

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DON'T BUY GASOLINE ENGINES UNTIL YOU INVESTIGATE "THE MASTER WORKMAN," a two-cylinder gasoline, kerosene or alcohol engine, superior to any one-cylinder engine; revolutionizing power. Its weight and bulk are half that of single cylinder engines, with greater durability. Costs Less to Buy—Less to Run. Quickly, easily started. Vibration practically overcome. Cheaply mounted on any wagon. It is a combination portable, stationary or traction engine. SEND FOR CATALOGUE. THE TEMPLE PUMP CO., Mfrs., Meagher and 15th Sts., Chicago. THIS IS OUR FIFTY-THIRD YEAR.

Cutaway Tools for Large Hay Crops.
Three of Clark's Intense Cultivators produced this year on 14½ acres 102, tons of well dried Alfalfa Timothy & Red Top hay. If you want to know how

CLARK'S DOUBLE ACTION JOINTED POLE CUTAWAY HARROW



Send for Circulars to the CUTAWAY HARROW CO., Higganum, Conn., U.S.A.

THE Apple Automatic Sparker

THROW OUT THAT BATTERY

that causes so much trouble on your gas engine, and install an **Apple Automatic Sparker.** No switches, no belts, no batteries for starting or running. A dynamo that produces a strong, steady current and furnishes a fat, hot spark at all times.

Write for information.

DAYTON ELECTRICAL MFG. CO.
152 St. Clair St DAYTON, OHIO.



A low wagon at a low price. Handy for the farmer. Will carry a load anywhere a horse can travel.

Low Down Wagons
soon earn their cost on any farm.

Steel Wheels
for farm wagons. Straight or staggered spokes. Any size wanted, any width of tire. Hubs to fit any axle. For catalogue and prices, write to



Empire Mfg. Co., Box 300, Quincy, Ill.

LIGHTEN YOUR LABORS
BY USING A
STANDISH FOOT-POWER HAMMER.

Takes the place of a helper. You can do more work and better work.



Our Power Hammers give perfect satisfaction wherever used and they are doing good work in the best shops in the country. Drop us a card and we will send you interesting descriptive circulars free. Write at once—today.

The Standish Machine & Supply Co.,
COLUMBUS, O.

VISES



COLUMBIAN

DID YOU EVER TRY TO SUPPORT AN automobile wife on a wheel-barrow salary?

Presuming you did—didn't you find it unprofitable? Did you ever try to turn out high grade goods with poor tools?

Presuming you did—didn't you strike bottom hard and end up with a sudden jolt that put you on your feet?

Well, if you never did either one of these two fool things, take our warning and don't try it, as you are sure as fate to lose.

There is a good sound reason for our having a large and roomy plant of unusual perfection. It is because we know we can not give you the right kind of tools unless we use the best machinery and workmanship that we can possibly get. You will agree with us this far, will you not?

Here—in our spacious plant with its unchallengeable quality, are made vises and anvils which we call Columbian Original Trenton Wrot-Steel Solid Box Blacksmiths' Vises and Columbian All-Steel Anvils.

The word "Columbian" stamped on any of our products is the best symbol of quality to be found anywhere—it's absolutely guaranteed.

Suppose you had a vise that weighed 50 pounds—that is 50 solid, substantial pounds of good old hard stuff—steel, (and the vise did not weigh 45 or 46 pounds—as do most vises that are marked 50 lbs.) wouldn't it stand to reason that the real 50-lb. vise would help you more in tight pinches and strains without springing out of shape?

Isn't it reasonable that you pay for your vise according to what it weighs? We charge a little more, but in return give you guaranteed quality and a more useful article.

Columbian Vises and Anvils are correctly finished—that is, carefully painted and wrapped—highly polished.

Well, this is enough—if you are not thoroughly convinced now send for our catalog No. 16. It's interesting and educating. Sent free—anywhere.

If our Anvils could speak they would issue soft, silvery notes.

THE COLUMBIAN HARDWARE COMPANY CLEVELAND OHIO

BRANCHES
168 Church St. NEW YORK
26 E. Lake St. CHICAGO

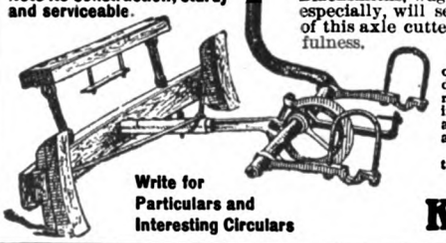


ANVILS

KELLER ECCENTRIC BRAKE

Warranted to lock wheels with three ton load with ease; can be applied to any wagon. Works without aid of rachet. Made in two sizes.

Note its construction, sturdy and serviceable.



Blacksmiths, wagon and buggy repairers especially, will see at a glance the merits of this axle cutter and appreciate its usefulness.

It will cut a pipe, boiler tube or shaft, as little or as much as desired and do its work accurately, taking the merest shaving from the end or cut in two at any point, its bearings being all on one side of the knife.

Attractive proposition offered to live agents.



Rod Pipe and Axle Cutter

Write for details

Write for Particulars and Interesting Circulars

Keller Mfg. Co. Sauk Centre, MINNESOTA.

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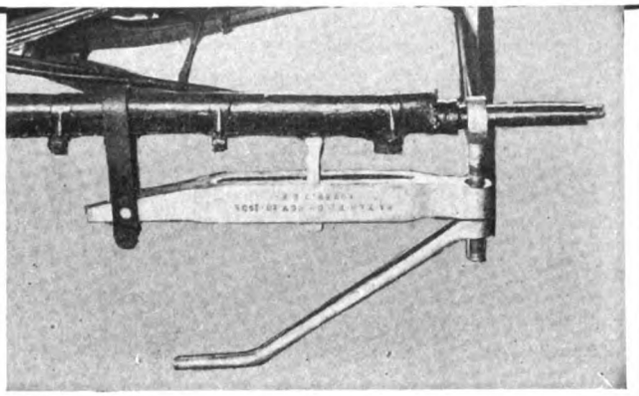
YEARS  AGONE

Men were satisfied with old fork wrench methods—now, it is simply a needless waste of time, temper and "knuckle skin" to handle tire-bolts with any ordinary wrench, when a little "Bay State" can be had that will so quickly (and so "slickly") set up or release such bolts. Blacksmiths, Wheelwrights and "Horse Sense" people in general, who have once met a "Bay State," never use any other sort.

THE BAY STATE CARRIAGE AND TIRE BOLT RATCHET WRENCH.

If your dealer don't have them, write us for tool lists for busy men.

TUDOR MANUFACTURING CO., Worcester, Mass.



STEADHAM COLD AXLE SETTER AND STRAIGHTENER.

A Labor and Time Saving Machine That Does Its Work Perfectly.

For setting or straightening Buggy Axles and all vehicles having a steel axle. Also Pitman rods of mowers, reapers and binders, bent rods and shafts in section harrows, cultivator beams, shaftings, etc.

The axle can be straightened in the vehicle **cold**, better than to take it out and heat it, and in one-tenth the time. Saves all the trouble of taking the axle out. No scarring of the wood or breaking of the paint.

No blacksmith can afford to be without this labor saving machine. It will bring you business. Your customer does not have to leave his vehicle and come after it a week later. You straighten the axle while he waits.

No matter where the axle is bent, the machine is so adjusted that it may be placed in any position on axle. Up or down, out or in, just a few minutes with the "Steadham Axle Setter" and the job is done. From one to five minutes is all the time required. One man can more than pay for the machine in **one hour.**

Mr. E. A. Glenn of Rockwall, Texas, is one of the many satisfied users. He writes as follows:

Dear Sir:—The "Cold Axle Setter" that I bought from you, does the work splendidly. It is the best investment I ever made in my shop.

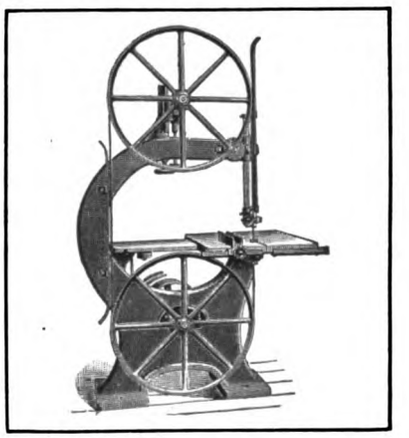
Further particulars on request. Or will ship at once on receipt of price, $10.00.

W. S. STEADHAM, ROYSE, TEXAS.

YOU NEED Wood Working Machinery.

Wood Working Machines in your Shop will enable you to do better work and more of it than you can do with hand tools.

We Build Just the Machine You Need.

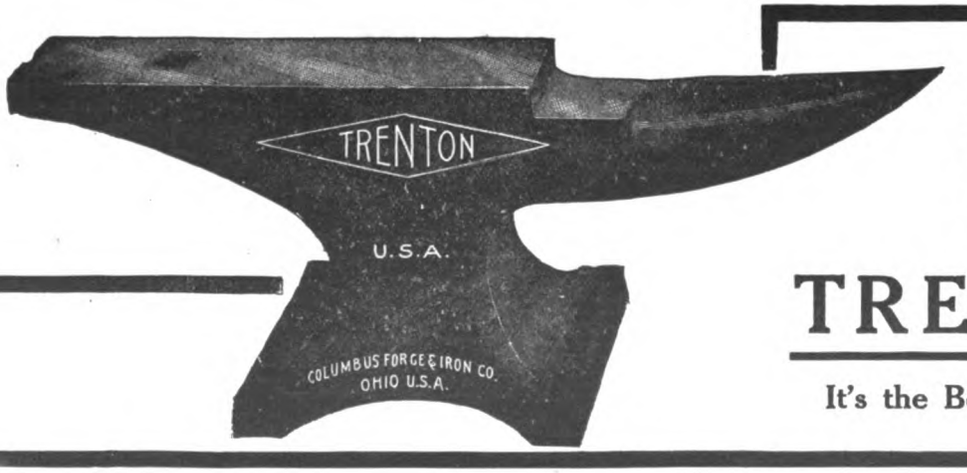


Catalog describing a fine line of moderate priced BAND SAWS, SAW TABLES and JOINTERS mailed on request.

SEND FOR IT NOW.

The Crescent Machine Co.,

245 Main St. LEETONIA, OHIO, U. S. A.



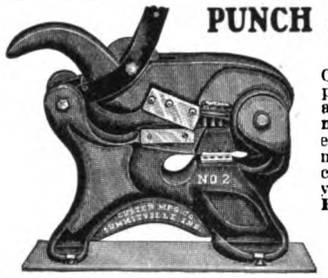
BEFORE YOU BUY AN ANVIL HAVE YOUR DEALER SHOW YOU THE

TRENTON

It's the Best Anvil Made.

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THE NEW CUSTER PUNCH AND SHEAR



Combines important points not known to any other machines made. The most powerful machine on the market. Drop us a card and we will tell you all about it.
For sale by jobbers.

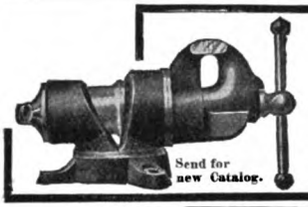


THE HANDY TIRE BOLTER.
Handiest and most convenient wrench made. Each wrench is equipped with 3 size sockets, 1/8, 3/16 and 1/4.

CUSTER MANFG. CO.,
SUMMITVILLE, IND.

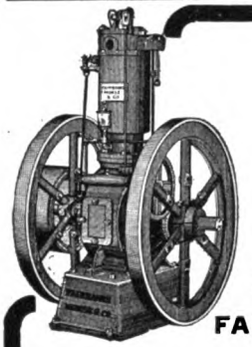
HONEST DEALINGS.

Before an advertisement is accepted for this Journal, inquiry is made concerning the standing of the house signing it. Our readers are our friends and their interests will be protected. As a constant example of our good faith in **American Blacksmith** advertisers, we will make good to subscribers loss sustained from any who prove to be deliberate swindlers. We must be notified within a month of the transaction giving rise to the complaint. This does not mean that we will concern ourselves with the settlement of petty misunderstandings between subscribers and advertisers, nor will we be responsible for losses of honorable bankrupts.



695 POUNDS
of solid mechanical muscle and brain constitutes
The "Pittsburgh" Railroad Vise,
capable of turning in any direction.
Opens 15 inches. Guaranteed.
The Pittsburgh Automatic Vise & Tool Co, Pittsburgh, Pa.





Look Ahead

The far sighted blacksmiths are closing their 1907 contracts for

Fairbanks-Morse Gasoline Engines

Why not be an agent and install one in your shop where you can show it to the best advantage. They are so **Reliable** and so well known you can't help making money. Send for Proposition No. 457AP.

FAIRBANKS, MORSE & CO., CHICAGO, ILL.
12 DEY ST., NEW YORK.



BLOWS THAT FORGE SUCCESS

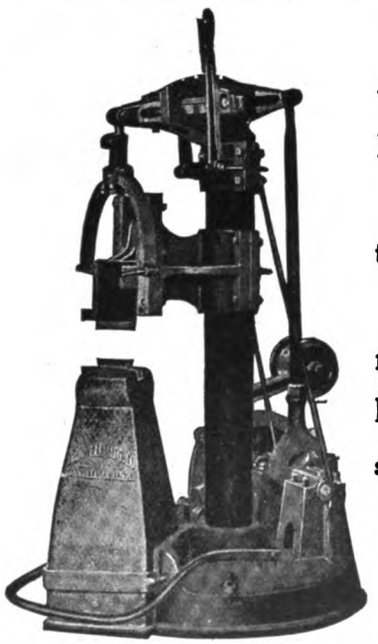
are blows of decision. Decision on your part to make something better of yourself, to advance your position, and make certain of future success. These are the blows that distinguish the successful man from the plodder who struggles along in one rut all his life living from hand to mouth. All that is necessary for **YOU** to gain this betterment is the determination to do so; the initiative to write the INTERNATIONAL CORRESPONDENCE SCHOOLS, that famous Wage Earner's College, and ask them how they can apply to your promotion the enormous resources and unlimited facilities which the experience and success of 15 years of advancement-gaining for wage earners has given them. By merely writing a postal asking for information this six-million dollar institution will send you a clear explanation of how it can help you to better your position and earnings in the surest, simplest, and cheapest way in the world. You do not have to leave home or your present work. Strike a blow for your advancement. Write us today. **Isn't your future success worth a postal card?**

Here is a List of Good Positions

Select the one you prefer, write a postal to the **International Correspondence Schools, Box 1302, Scranton, Pa.,** and ask how you can qualify to fill it at a good salary. Be sure to mention the position you prefer.

Foreman Molder	Electrician
Foreman Blacksmith	Architect
Foreman Machinist	Structural Engineer
Foreman Toolmaker	Contractor & Builder
Foreman Pat'nm'k'r	Foreman Plumber
Mechanical Engineer	Civil Engineer
Machine Designer	Surveyor
Mechanical Draft.	Mining Engineer
Stationary Engineer	Bookkeeper
Electrical Engineer	Stenographer
Elec.-Lighting Supt.	U. S. Civil Ser. Exam.
Elec.-Railway Supt.	Ad Writer

Modern Power Hammer



The ONLY hammer on which you can get a LIGHT BLOW at FULL SPEED.

The shifting lever controls the length of stroke.

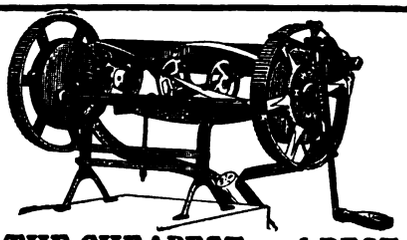
Set it in any one of the five notches and then handle the hammer with the treadle the same as any other.

Actually five hammers in one.

Write any jobber or the

THE GRINNELL MFG. CO.,
GRINNELL, IOWA.

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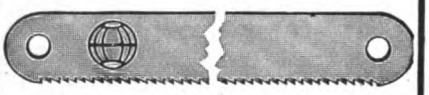


THE CHEAPEST and BEST

Sharpens Mowers in five minutes.
Reversing not necessary,
Malleable Castings. PRICE $1.00
WRITE FOR CIRCULAR.
E. C. Springer & Co., Mason City, Ia.

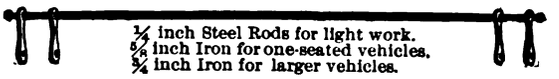
Your Hack Saw Troubles

will come to an end if you get the old reliable Universal brand. Send for our free booklet with hints on the use of the hack saw.



West Haven Manufacturing Co.
NEW HAVEN, CONN.

STEEL EQUALIZERS---FOR SIDE SPRING BUGGIES

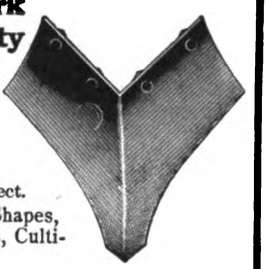


¼ inch Steel Rods for light work.
⅝ inch Iron for one-seated vehicles.
¾ inch Iron for larger vehicles.

THE TOPLIFF & ELY CO., Elyria, Ohio.

"CRESCENT" The Mark of Quality





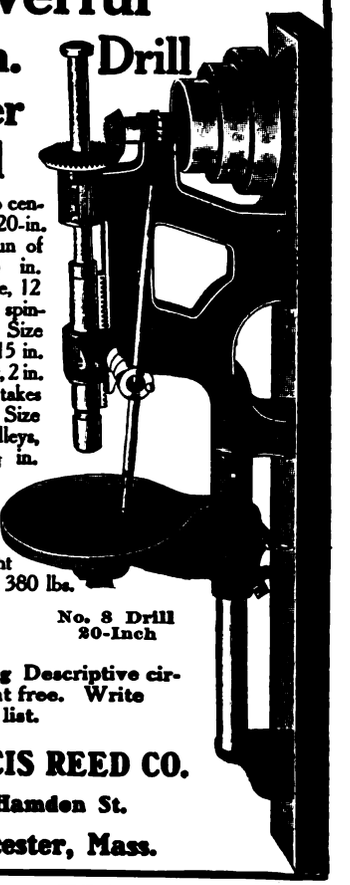
Insist on the "Crescent"
brand and if your jobber cannot supply you write us direct.

We manufacture a full line of High Grade Agricultural Steel Shapes, Fitted and Bolted Plow and Lister Shares, Merchant Plow Shares, Cultivator Blades, Subsoiler Blades, Landsides, etc., etc.

WRITE FOR CATALOGUE.

CRESCENT FORGE & SHOVEL CO., Havana, Ill., U. S. A.

Powerful 20 in. Drill Lever Feed



Will drill to centre of a 20-in. circle. Run of spindle, 8 in. Run of table, 12 in. Size of spindle, 1½ in. Size of table, 15 in. Size of post, 2 in. Drill socket takes 41-64-in. Size of cone pulleys, 6¾, 8½, 10½ in. Tight and loose pulleys, 8 x 3 in. Total weight of machine, 380 lbs.

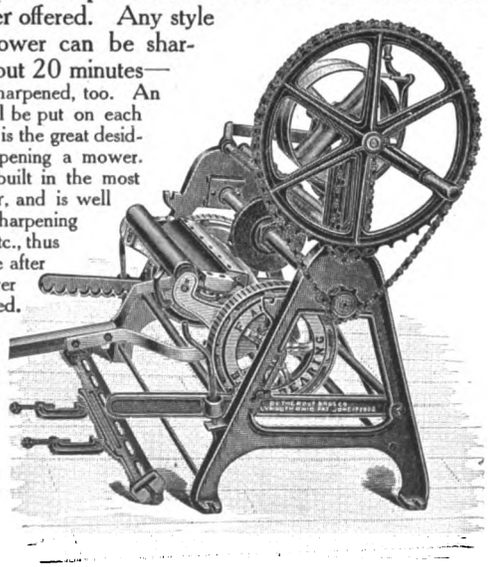
No. 8 Drill
20-Inch

Interesting Descriptive circulars sent free. Write for price list.

FRANCIS REED CO.
43 Hamden St.
Worcester, Mass.

THE IDEAL LAWN-MOWER GRINDER
1907 PATTERN

is now on the market and as an adjunct to the Blacksmith Shop or Repair Shop will be found one of the most useful machines ever offered. Any style of Lawn Mower can be sharpened in about 20 minutes—and perfectly sharpened, too. An exact bevel will be put on each blade, and this is the great desideratum in sharpening a mower. The Ideal is built in the most durable manner, and is well adapted for sharpening tools, skates, etc., thus being of service after the lawn-mower season has ended.

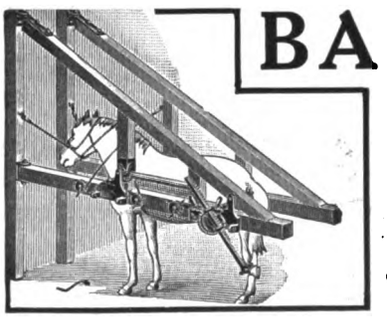


It is a money-maker from the beginning. You cannot afford NOT to have an Ideal Grinder and we can prove it.

WRITE FOR PARTICULARS.

ROOT BROS. CO., PLYMOUTH, O.

BARCUS Horse Stocks



In use in all modern shoeing establishments, because they fill every shop requirement and give satisfaction everywhere. Everyone fully guaranteed. All the objectionable features of the cheap stocks eliminated.

BARCUS STOCKS are simple, strong, solid, safe and sure to hold. No ropes or pulleys to tangle or break; no bracing to roof or floor, but furnished complete ready to bolt to the stationary posts in your shop. You can rely on

Barcus Stocks Every Time.

ASHLAND, ILL., May 14, 1905.

MR. GEO. BARCUS:—I wish to say that the horse rack we bought of you gives perfect satisfaction in all respects.

Yours respectfully, HODGINS & DOUGLASS.

IMOGENE, WIS., Nov. 5, 1906.

GEO. BARCUS & CO.—Gentlemen: I have used one of your racks for three years and find it a fine thing. I have shod everything that comes from 700 pounds to 1900 and hold the large horse as well as the small one. Have handled horses that wiped out three to five shops and had no trouble handling the wildest of them as easy as the tamest. Would not be without it for twice the money. Your stocks are just the thing for you can lock the horse solid.

Yours very truly, JAS. McGARRY.

Write for particulars.

GEO. BARCUS & CO.,
Box 61, WABASH, IND.

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EXTENSION AXLE **NUTS** CURE WABBLES. Make old buggies run like new; very profitable for agents. Exclusive Territory.
HARDWARE CO., BOX 510, PONTIAC, Mich.

FOR STRENGTH, SAFETY, AND QUALITY OF MATERIAL
NORTHWESTERN HORSE NAILS
ARE THE BEST ALL AROUND
Perfection in form and finish. Made of the best Swedish iron
Union Horse Nail Co., Chicago, Ill.

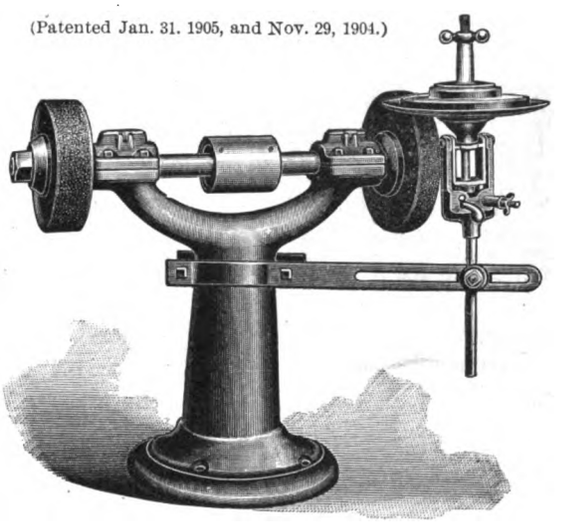

"CAN'T SLIP" CALKS AND SHOES
are interchangeable with all other makes of removable calks. Sold only to the horseshoer, through leading supply houses who are our regularly established agents, and direct from the factory where no agencies are established.
BITTENBENDER & CO.
128, 130, 132 Franklin Ave.,
SCRANTON, PA.


AGENTS WANTED FOR
"Always Sharp" Calks
WRITE FOR PARTICULARS
Handsome descriptive booklet free. Our calks have the reputation of being the most durable and most satisfactory on the market. We will send free samples to convince you.
ALWAYS SHARP CALK COMPANY
Jersey City, New Jersey




STEEL STAMPS
Steel Letters and Figures
BURNING BRANDS
Stencil Dies, Stencils, Etc.
Geo. M. Ness, Jr.,
61 Fulton Street, N. Y.
Price List sent upon application.


LAFFITTE WELDING PLATES
HAVE YOU TRIED THEM ?
CHEMICALLY WELD IRON AND STEEL AT A LOW HEAT.
SEND FOR SAMPLE
And our Booklet. They will be of interest to you.
The Phillips-Laffitte Co., Penna. Bld'g. Philadelphia, Pa.

(Patented Jan. 31. 1905, and Nov. 29, 1904.)


PERFECTION DISC SHARPENER
Emery Stand Attachment.
This sharpener is neat, durable, compact and economical, and has perfect adjustments. Will sharpen any sized disc with any desired bevel and works noiselessly, automatically, and rapidly, without heating or drawing the temper: It sharpens the disc perfectly, requires little attention and pays for itself daily. Can be varied to fit any stand and will last a life-time.
IMPORTANT
You cannot find a sharpener anywhere that will do work as good or require as little labor or attention as this; nor can you find a sharpener anywhere that will pay for itself as quickly as this—a strictly first-class sharpener at small cost. Fully guaranteed. Shipped on trial to responsible parties. For sale by jobbers or shipped direct.
R. M. HAMMOND COMPANY,
DELLVALE, KAS.

STRIKE WHILE THE IRON'S HOT ON A PETER WRIGHT ANVIL.



FOR SALE BY THE LEADING DEALERS ALL OVER THE UNITED STATES.
AGENTS FOR THE MANUFACTURERS
WIEBUSCH & HILGER, L'D
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NEW YORK, N. Y.

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BETTER JUMP AT THIS CHANCE

NEVER before has this book been sold for less than $2.00 and never again will you be able to secure it at this low price.

Now $1.50 Until April 15th.

ONE of the the best books on horseshoeing ever published. It contains photographic illustrations of over 280 styles of shoes, twelve full page plates (two of which are colored), some 50 half-page engravings, to say nothing of the many smaller illustrations. It contains over 200 pages of practical scientific matter on Anatomy of the Foot, How the Hoof Grows, Curing Lameness and Faulty Action, the Bar Shoe, Specific Diseases and Accidents, Formulas, Recipes, Etc. The illustrations are fully explained, plates are indexed and the usage of all shoes fully detailed. At the regular price of $2.00, "Rich's New Artistic Horseshoeing" is cheap, but we offer a limited number of these books at the low price of $1.50. This offer is good until April 15th only, and under no circumstancies will copies of the book be sold at this price after that time. It is neatly and substantially bound in green library cloth, and is by no means a low-priced book, but the same that



MY LATEST BOOK

ARTISTIC HORSESHOEING

SHOULD BE IN EVERY UP-TO-DATE SHOP.

THE PROGRESSIVE SMITH

will find it invaluable in his every day work. A practical, scientific treatise on improved methods of shoeing. Special directions given for correcting faulty action in trotters and for shaping shoes to cure different foot diseases. 284 different styles of shoes illustrated and explained. ***Cloth bound, 217 pages, Price $2.00.***

AGENTS WANTED.

has been advertised for the past year

For $2.00.

NOTE THE ACCOMPANING ADVERTISEMENT.

If you are not now a regular reader of The American Blacksmith, send us $2.00 before April 15th, and we will send you a copy of "Rich's New Artistic Horseshoeing" and The American Blacksmith for one year. But you will need to take advantage of either offer now.

PRICE GOES TO $2.00 AFTER APRIL 15th, and will continue to go up until entire lot is sold. We cannot guarantee to fill every order received at this price because of the limited supply. But we will fill orders at the special price as long as the supply lasts. Therefore get your order in early and remember we refund your money if you are not satisfied. ¶ Send money order, registered lettter, stamps or check **today** and mention this offer.

American Blacksmith Company

P. O. Box 974 **BUFFALO** N. Y., U. S. A.

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WHY NOT BUY A CHUCK

That will fit the spindle of your drill press, holding drills ¼ to ½ in. inclusive, with reducer to $\frac{3}{32}$? Drills held by this chuck are much cheaper than drills with ½ in. or ⅝ in. shank. Simplest and cheapest chuck on the market.

WRITE FOR CATALOGUE AND PRICES



DETROIT TWIST DRILL CO.
228 21st Street, Detroit, Mich.

SPALDING BOLSTER SPRING

Also Team Doubletrees, Poles, Shafts, 3-Horse Hitch



Send for Catalogue Insist on the **Adams End Plate** from your Jobber or write us

Be sure and get the Adams Patent End Plate
E. B. ADAMS & SON, - RACINE, WIS.



VULCAN IRON WORKS

MASON CITY, IOWA.

INCORPORATED

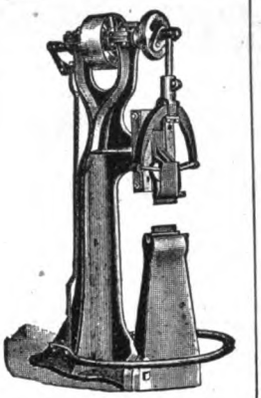
Prices and goods right.
Catalog free, write today.

Universal Tenon & AND & Boring Machine

for wagon repair shops. Cuts tenons on set of wheels in 12 minutes.

Vulcan Power Hammer,

Only perfect adjustable stroke, operated entirely by treadle.

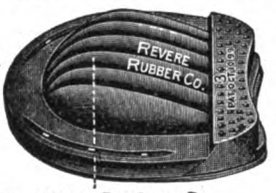


A COURSE IN VETERINARY MEDICINE

PRELIMINARY LECTURE FREE BY MAIL

BEN TROVOTO
STATION H
CINCINNATI, O.

AIR CUSHION *RUBBER HORSESHOE* PADS



See That Cushion?

It fills with air at each step. That's what breaks concussion. That's what prevents slipping. That's what keeps the foot healthy. That's what cures lameness.

Twelve Different Styles



Heavy Leather Back

NO LAMENESS NO SLIPPING CHEAPEST AND BEST

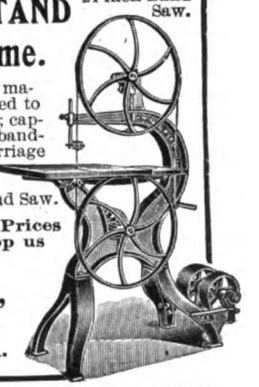


Medium Canvas Back

REVERE RUBBER CO.
Sole Manufacturers & & BOSTON, MASS.

BUILT TO STAND the Test of Time.

24-inch Band Saw.

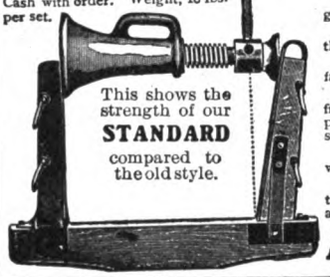


A well-made, accurate machine; especially adapted to run by gasoline engine; capable of all kinds of band-sawing, particularly carriage repair work. These are a few of the fine points of Marston's Band Saw.

We will gladly send Prices and Circulars. Drop us a Card today.

J. M. Marston & Co.,
222 Ruggles St.,
Boston, Mass., U.S.A.

We make the following sizes:
No. 1, 3 in. wide, 14 in. high
" 2, 3¼ " 14 "
" 3, 3¼ " 10 "
Price, $1.65 per set of 4 stks
Cash with order. Weight, 16 lbs. per set.



This shows the strength of our **STANDARD** compared to the old style.

The Bruce Malleable Wagon Standard

This Malleable Iron Bolster Standard has been tested thoroughly, and we guarantee it strictly as represented.

Anyone familiar with the farm wagon will readily see the great advantages of the Malleable Iron Bolster Standard over the old style.

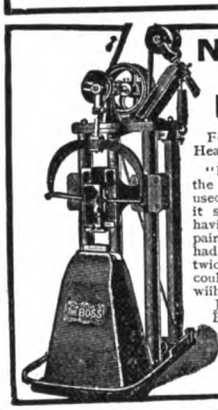
1. Made of the best grade malleable iron. It has been thoroughly tested by factories and wagon makers and pronounced a great success.

2. It is attached to bolster by means of two bolts passing through bolster from the side, and one bolt from top to bottom of bolster, thus holding standard perfectly solid, and at the same time strengthening end of bolster, which in old style is weakened by mortise.

3. The Malleable Iron Standard has a 3 1-2 in. face at base, which prevents wear on wagon box, while the old style has only a 7-8 inch face.

4. Great time saver. Can be attached to bolster in one-fourth the time required to put on wood stake. Adapted to new and repair work. The price will justify all classes of the trade in using this standard.

A. H. HARSHBARGER, Bement, Ill.



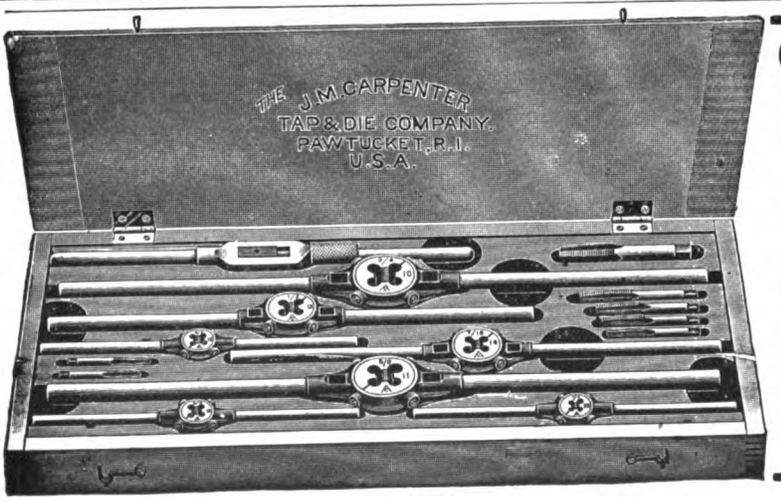
NOVELTY IRON WORKS BOSS HAMMER

For Plow Work, Wagon Work, Heavy Work, Any Work.

"I am more than pleased with the Boss trip hammer. I have used it three years and have found it satisfactory in every way, not having to put a cent's worth of repairs on the machine since I have had it, and have used it hard: twice the amount I paid for it could not get me to sell and do without it.

JOE KALINA, Jr., Kansas. Blacksmithing & Machine Wks.

G. E. DAVIS, Mgr., DUBUQUE, IOWA.



CARPENTER'S NEW FULL MOUNTED DIE SETS

With a stock for each die and the Original Nichols Tap Wrench.

Before buying a die set you should see **Carpenter's** and you will have no other make.

Send for catalogue

The J. M. Carpenter Tap & Die Co.
Pawtucket, R. I., U. S. A.

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Do Not Accept Imitations

When you ask for an article you have seen advertised in The American Blacksmith, see that you get it. Don't let your dealer sell you something which he calls "Just As Good." Don't let a traveling man talk you into buying an inferior make. The goods advertised in these columns are made by firms whose reliability **we guarantee.** You run no risk whatever in buying these goods. Refuse imitations.

Insist Upon Getting What You Ask For

Buffalo Punches Shears and Cutters

BUILT OF ARMOR PLATE—NO CAST IRON TO BREAK

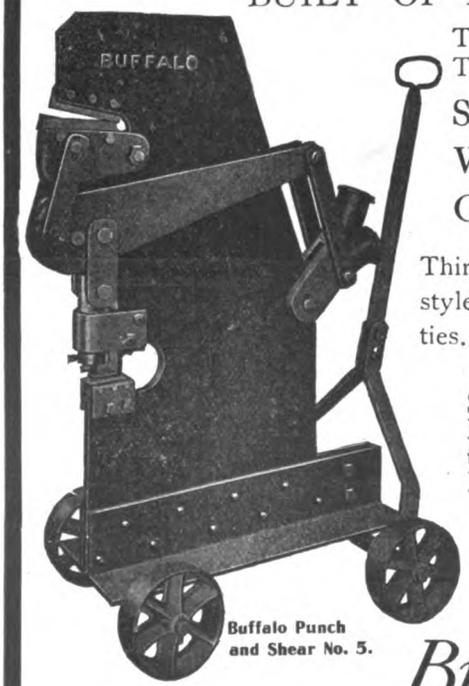
TENSILE STRENGTH OF ARMOR PLATE 175,000 POUNDS, THAT OF CAST IRON 10,000 POUNDS. THINK IT OVER

SHEARS ANY LENGTH WITHOUT BINDING OR CRIMPING

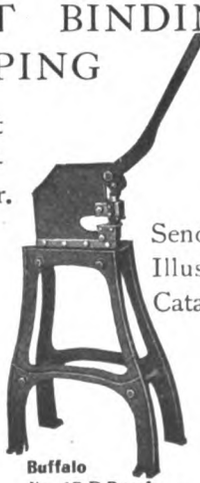
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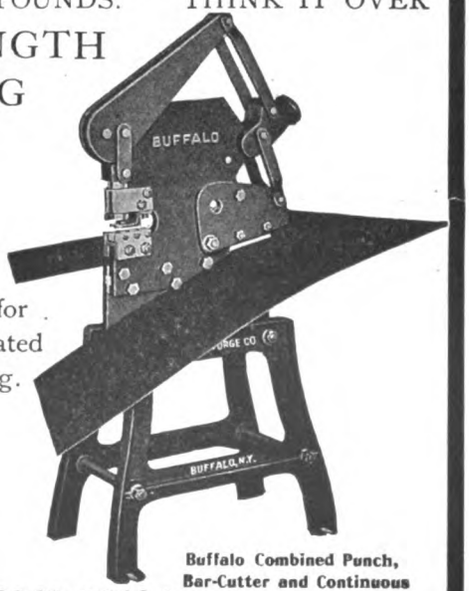
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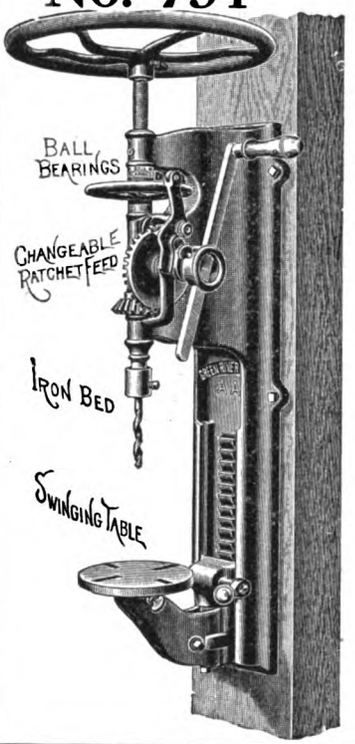
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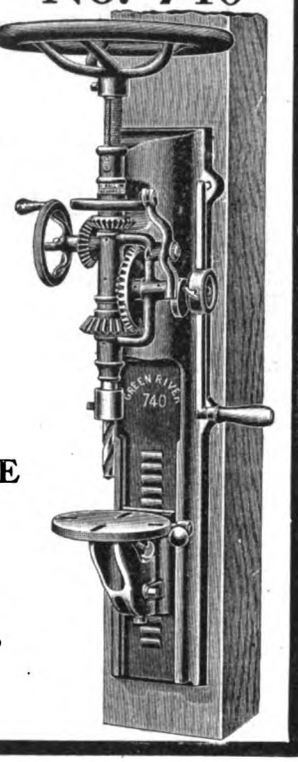
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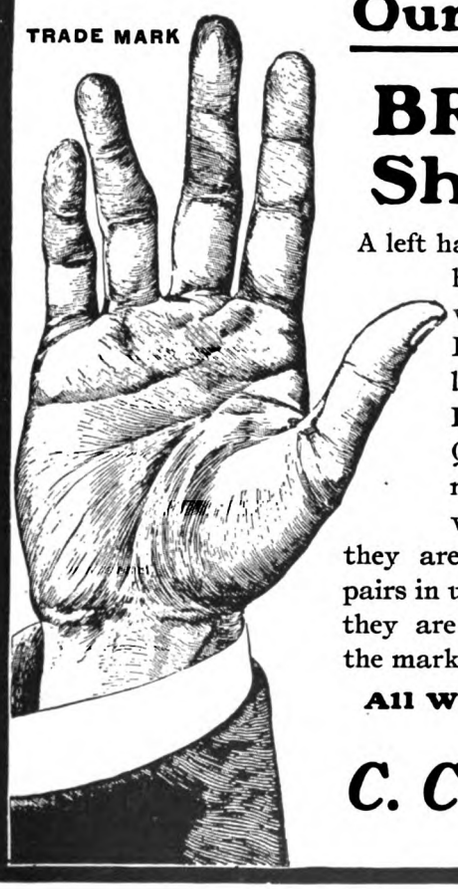
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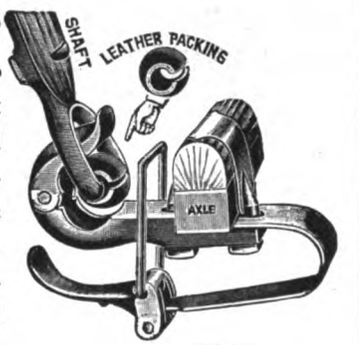


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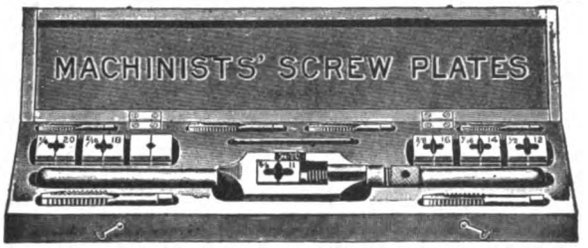
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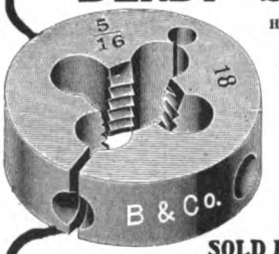
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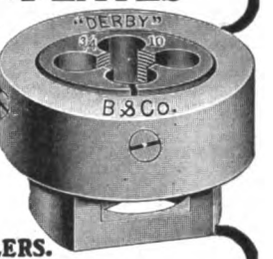
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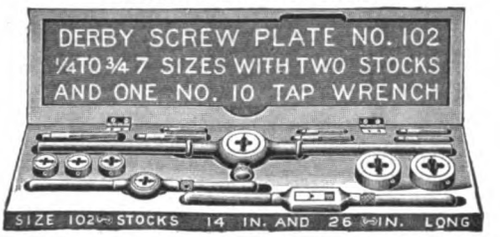


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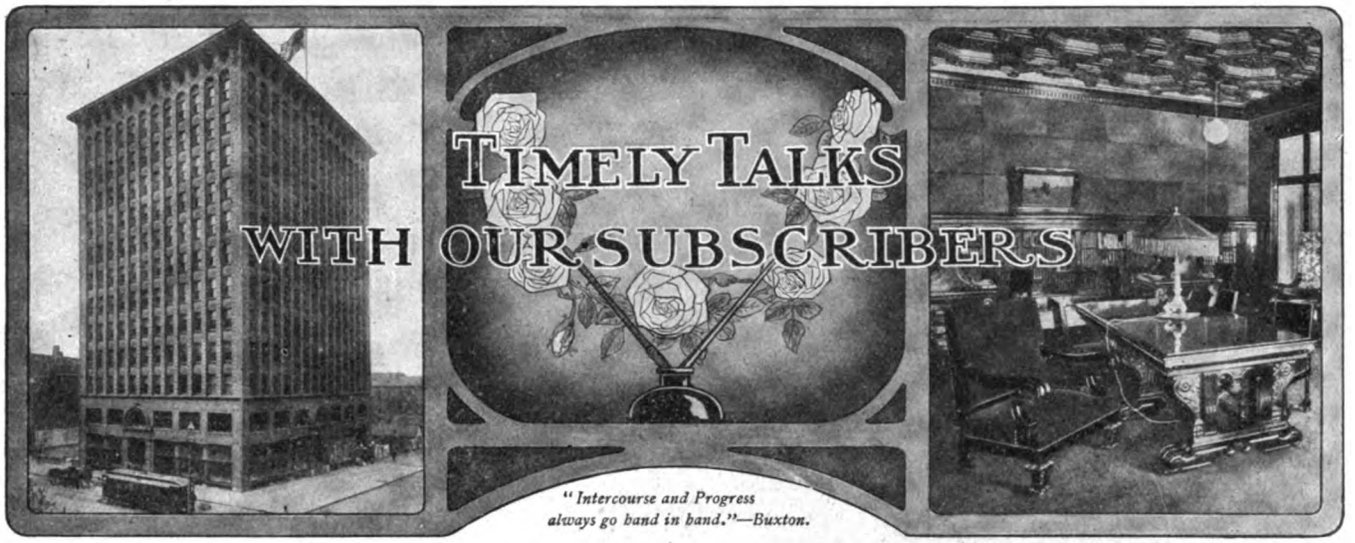
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Inquiries are received almost daily from readers, regarding good craft books, and it is for the purpose of assisting "Our Folks" in choosing their libraries that we publish the following list of practical craft books.

Books on steel working and manipulation:

"The American Steel Worker." Markham. $2.50
"Hardening, Tempering, Annealing and Forging of Steel." Woodworth. 2.50
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"A. B. C. Guide to Horseshoeing." Magner. 1.00

Books on gas engines and their operation:

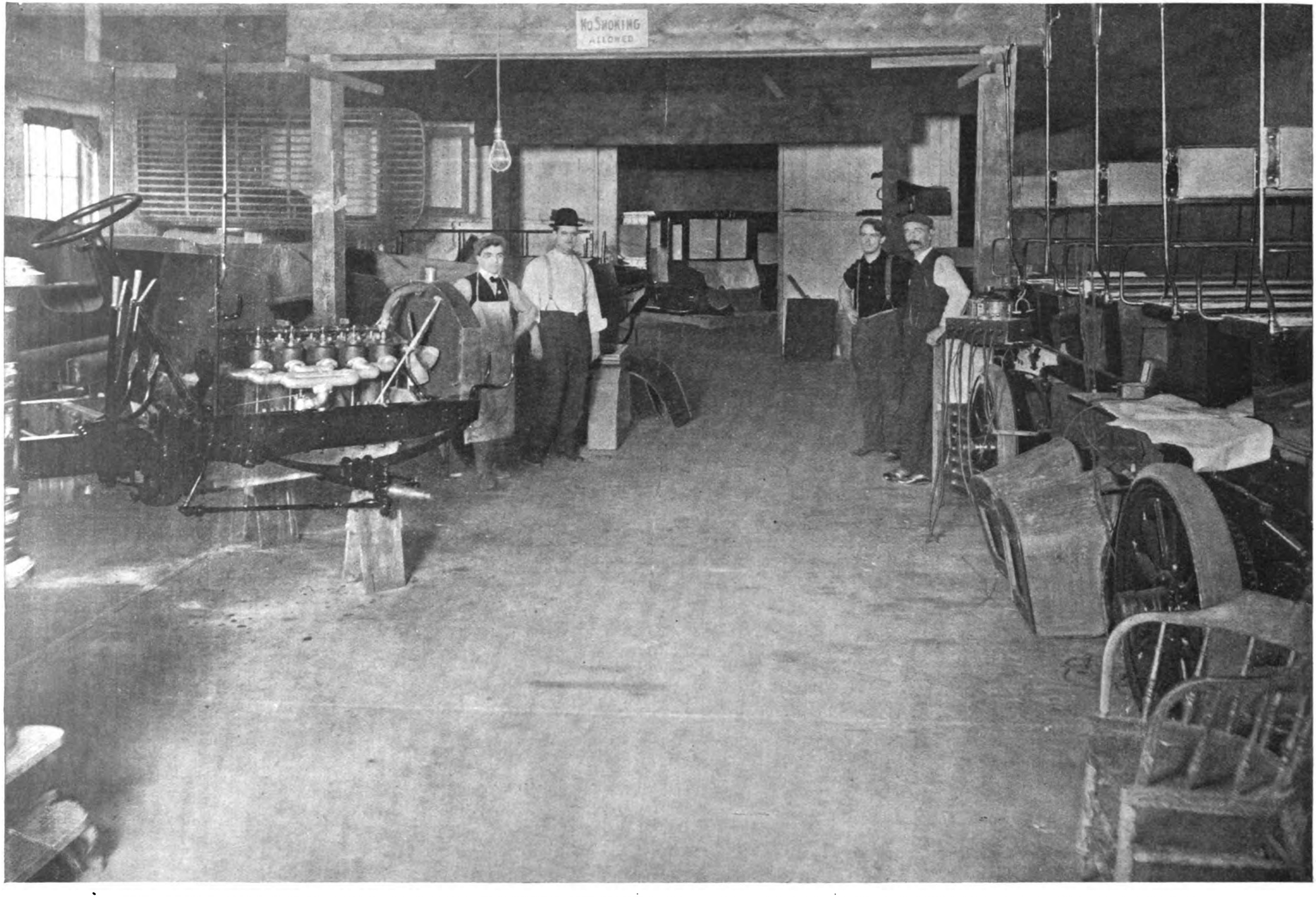
"The Practical Gas Engineer." Longnecker. 1.00
"Plain Gas Engine Sense." Osborne. .50

Books on other subjects:

"Foden's Mechanical Tables." .50
"Practical Carriage and Wagon Painting." Hillick. 1.00
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THE VEHICLE PAINTER MUST ALSO CARE FOR THE AUTOMOBILE, AND MANY SHOPS HAVE ALREADY ARRANGED TO ACCOMMODATE THE MODERN MOTOR CAR

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Modern Carriage and Wagon Painting

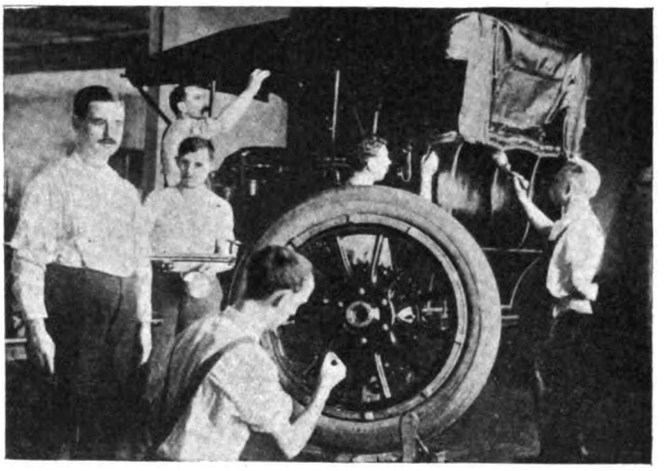
M. C. HILLICK



THE really satisfactory thing about the art or the trade,—call it what you will—of carriage and wagon painting, is that it is not subject to the limitations of an exact science. It may occupy one point of vantage today, and a wholly different one to-morrow. It is given over to changing methods and processes and to the development of new details which compel its craftsmen, if they would meet the emergencies of the hour, to be students as well as brush wielders.



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In the space allotted to a single article it was superfluous to attempt to more than speak in a general way of what is today esteemed the best practice in the painting and finishing of horse-drawn vehicles. In view of which we shall confine our attention to a review of the more prominent aspects of the trade.

At the present time there are two distinct systems, at least, recognized in the trade—the patent specially factory prepared surfacers, and the surfacers mixed and made up by the painter as requirements suggest. Both systems are widely used, the former probably being in more general favor where unusually quick work is demanded, and the latter adhered to by a very large class of expert workmen who prefer to know the contents of the paint bucket at first hand.

Moreover, there are a great number—indeed, we may say a great majority—of jobbing shop painters catering to the best class of trade who believe, with a faith born of experience, that the time-honored oil and lead surfacer, in point of excellent results furnished, stands today, as in all former days, unrivalled. In most of the New York City vehicle paint shops visited by the writer, white lead and oil holds the impregnable position.

In contrast, however, to former practices, the minimum quantity of raw linseed oil, consistent with durable results, is now employed. This retreat, if such it may be called, from the use of the maximum quantity of oil, became necessary through the changed conditions and demands of society, and, all things considered, it has been a change sanctioned as "the saving grace" of the trade, by men in a position to speak for the larger interests of the craft.

Priming and Lead Coats.

Inasmuch as the patent and factory made surfacers reach the consumer labelled, with full instructions concerning their use, we direct attention to the oil and lead system as of greatest interest to readers of THE AMERICAN BLACKSMITH.

First, then, the primer to mix which, for soft woods, use, say, raw linseed oil three parts; turpentine one part. Stain slightly with keg white lead, and to a pint of the mixture add a teaspoonful of good coach japan.

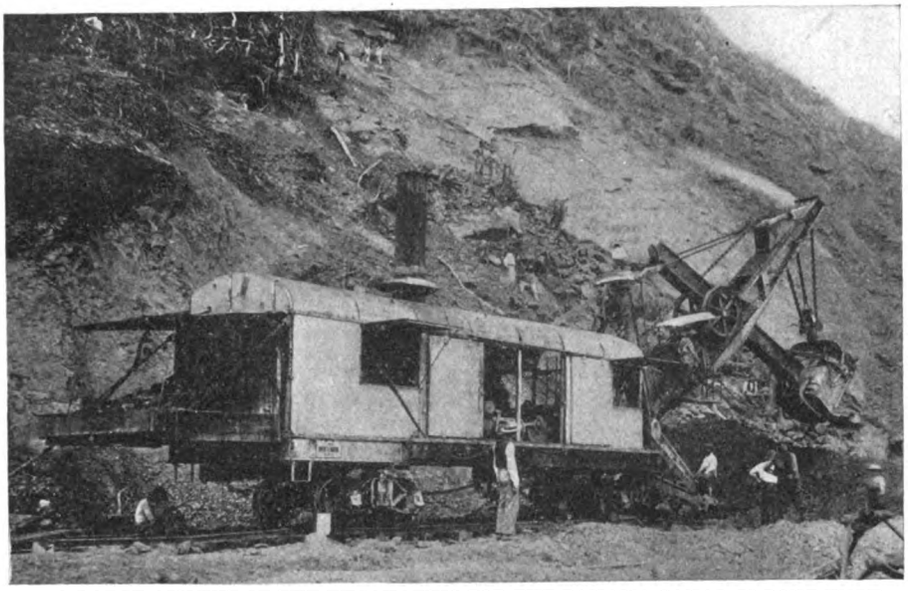
For hard woods, use the same primer, with the exception of the quantity of oil, which should be reduced to five parts of oil and three parts of turpentine.

First lead coat, for soft wood, mix with two parts oil to five parts turpentine. Add white keg lead, stained with whatever color the final color of the job is to be, and beat up to a proper consistency to apply with a bristle brush. For hard wood, use one pint oil to six parts turpentine, adding pigments as for soft woods, and in both cases use 30 drops of coach japan to a pint of the paint. Second, lead is mixed as follows:—White keg lead, again colored with the final color beaten gradually up with turpentine, to a consistency to be applied with a camels' hair brush, and containing no oil except that in which the lead is ground, which will suffice for a binder. This lead coat is not generally used upon surfaces to be coated up with roughstuff.

Upon running parts surfaced with rub lead, the above lead coat is withheld until after the application of the rub lead. The rub lead is then sandpapered thoroughly, when dry, and the flat or dead lead, as it is variously termed, applied.

Mix rub lead in this way:—Mix dry white lead to a consistency to permit running through the paint mill in three parts raw linseed oil and one part coach japan, coloring the lead as above advised. Make the paste thick enough to go on with a stiff brush. Allow the lead to reach a decided "tack" and

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A LARGE AMOUNT OF THE EXCAVATING FOR THE PANAMA CANAL IS DONE WITH STEAM SHOVELS. THIS SHOWS ONE OF THE 95-TON STEAM SHOVELS IN OPERATION

rub into the surface with the bare palm of the hand, or with the hand encased in a harvesting glove. For obtaining a strictly high class surface this system remains unexcelled.

To make putty for either bodies or running parts, carriages or wagons, mix three-fourths dry white lead and one-fourth finely bolted whiting to the proper working consistency in equal parts of rubbing varnish and coach Japan. As a rule, putty the surface on the first coat of lead above the priming.

Of the mixing of roughstuff, there are many methods, but the one that has stood the test of years as an all-round stuff for either carriages or wagons is made thus:—By weight, equal parts of white lead (keg) and any good American filler. Mix with equal parts of rubbing varnish and coach japan to a paste sufficiently thick to hold a stick upright when thrust into the centre of the mass. Then with turpentine thin out to a brushing consistency, remembering this fact, however, that in all cases roughstuff should be carried to the surface a trifle heavier in body than ordinary paint. At the same time, it should flat out free from brush marks.

For rubbing roughstuff the artificial pumice stone, or "rubbing brick," as it is perhaps more generally known, is quite universally employed. This may be obtained in various grades running from fine to coarse, but the grades most useful to the carriage and wagon painter are two, namely, fine and medium, the latter for taking off the top surface and the former for finishing off with finally.

An asphalt rubbing deck should be a fixture in every vehicle paint shop, large or small. It should be provided with a drainage pipe. Here both the rubbing of roughstuff and the rubbing of varnish may be performed, along with the washing of vehicles in general.

The rubbing of roughstuff is an important operation, and it should be given expert attention. Always, in rubbing, use clean, soft sponges, and clean water in plentiful quantities, and direct the strokes of the brick straight out and back from the shoulder. Keep the brick running free, and hold firmly to the surface. For new work from five to six coats of roughstuff should be used, and this will permit the surface to be rubbed to a fine clean, level, and absolutely smooth surface.

All the formulas above given will apply to old work as well as new, excepting in the case of the rub lead and the priming. For what is called first lead we should use as a primer upon old paint surfaces of a more or less checky, flaky nature. And instead of rub lead, for all old work, except burned off surfaces, we would substitute knifing lead, the principal and reliable formula for which is, dry white lead, two parts; keg white lead, one part. Add enough rubbing varnish and coach japan to moisten the pigments, and thin to a knifing or glazing consistency with turpentine. Use an elastic putty knife and glaze all the coarse, eaty spaces of surfaces, drawing the pigment out smooth in order to reduce the cost of sand papering.

Choice and Application of Colors.

All colors, or practically all, at present used in vehicle painting are japan ground. In preparing for their use, break these colors up gradually in *pine* turpentine (beware of substitutes which are as plentiful as revolutionists in Russia) and mix thoroughly until the mass is completely liquified. Such colors as black, most of the greens and many of the modern reds may be used as solid colors, and require no preparatory ground color.

For first class work, however, in which price is not the main consideration, all rich blues, greens and reds are brought up and glazed. For rich green bring the surface up solidly with green, and shade with yellow, lake or verdigris, as the shade may be desired.

For dark rich blues, bring the surface up with regulation black. Then apply body blue, to be had in three shades. Beat this blue up in turpentine, and use a teaspoonful of raw linseed oil to a pint of the color. With a camel's hair brush lay the color on very smooth. For the next coat use equal parts of the body blue and ultramarine, mixing as before. Next float, say, two-thirds of an ounce of ultramarine blue in a pint of elastic rubbing varnish, and apply two coats of this, both of equal strength. The lakes which are popular may be developed in this way:

Munich lake—make ground color of Indian red shaded with black. Then thin munich lake with turpentine, adding a teaspoonful of varnish to bind the lake to the surface. Apply the lake smooth and thin. Then, in a pint of elastic rubbing varnish, mix two-thirds of an ounce of lake, and of this glaze apply two coats.

For carriage lake, use same ground and same process.

For English purple lake use a black ground; Chalemue lake, deep carmine ground; English scarlet lake, vermilion ground; crimson lake, deep red ground. For carmine, the prince royal of all the family of pigments, first lay a coat made up of Indian red and orange yellow, over which coat up to the desired shade with English vermilion and carriage part lake. Glaze over this with No. 40 carmine in the proportion of one-half ounce to a pint of varnish.

In the matter of varnishing and finishing, either for cheap work or for the best, aim, first of all, to get as clean surroundings as possible. For the cheap work, use fewer coats but make them clean and nice. Get the surfaces, both body and running parts, washed and dusted clean. Clean varnishing helps to cover a multitude of defects. What has been above outlined necessarily embraces only the leading

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features of painting and finishing new and old vehicle painting work.

How to Weld Channel Tires.

W. H. OBLAD.

First run your wheel with your traveler, then run your tire and allowing about o of an inch for scarfing, cut off cold on the bottom tool. Then heat your tire and, with the ball part of your hammer, scarf both ends of the tire, the flat part and also the flanges. Now place both ends in fire and heat. When hot put them together on the bottom tool, fit both the flat part and the flanges snug, and pin with center punch. Care should be taken when trying the top tool, so that it starts to go over the tire tight without tearing away the edge. Now place a pinch of welding compound between the parts as well as on the top, and then take a slow heat, so as not to burn the edges. When your heat is ready, lift tire out on bottom swage and place top tool upon it quickly. Have the helper ready to strike four or five sharp, quick blows, and then knock the tool off end ways and your weld is ready to chisel and grind on emery wheel or to file smooth. If the first heat did not weld as good as it should, take a light borax, heat and place it on the bottom swage and tap lightly on the edges and the flat part with hand hammer. Then put on top swage to smooth up. Now run the tire and see how it is for size. If to be upset in shrinker, or if too small, stretch upon the bottom swage with a fuller. Now heat and put on and fit the tire to the wheel, and proceed with the next. When I was working for the Studebaker Manufacturing Company, of Utah, I put them in from 1¼ to 1¾ hours with one a set of channels on, drilled and bolted helper.

Helpers in General and a Particular Job.

J. D. SKIDMORE.

I think if I knew a better way to do a thing than my brother, I would be glad to show him how I did it. I never worked for a smith in my life, but have had men work for me at the anvil who thought they knew all there was to know. Better to put this kind of a man on a job that he can do, and keep him at it. For he doesn't know enough to do general work, and you can't teach him anything. I traveled a lot in my time, and learned a great deal from some of the fine shops, but have never been in a shop so humble, but what I find something. I have done all kinds of work that could be done in a blacksmith forge. In fact I have never let a job leave my shop until it was repaired.

During Mr. Cleveland's administration as president, I had a man from Cincinnati working for me. A man brought a corn-mill to the shop. It was a three roll-mill with one of the spindles broken off even with end of the rolls, and the rolls had been cast around the shaft. The man did not want to send it to a machine shop, or buy a new mill, so I told him to unload it and I would fix it for him directly. I called my man from Cincinnati, who was a good workman, but who thought he knew a lot that he did not know. He said to me, "I would just like to see you fix that old junk up to grind corn." "I'll fix it," I said—I found later that this man was better at spoiling things than fixing them.

As someone may want to know how I fixed it, I'll explain. I took a heavy sledge and drove the old shaft out. I then got a two-inch shaft from the junk pile and with a hack saw I cut a piece the pole's length and fitted it in the rolls. It fitted good and tight. Now I filled in around it with all the small pieces of iron that I could get in. Then I drilled some holes through the rolls and shaft and put some steel pins through them. Babbit was then run to fill the rolls solidly. This made a good job and the mill is at this time as good as new.

In closing let me say that no one man can know all about the trade. Even should a man be the best posted —the trade is so large that he cannot know it all. Let us, therefore, learn all we can, where we can and when we can—even the "shop kid" knows something.

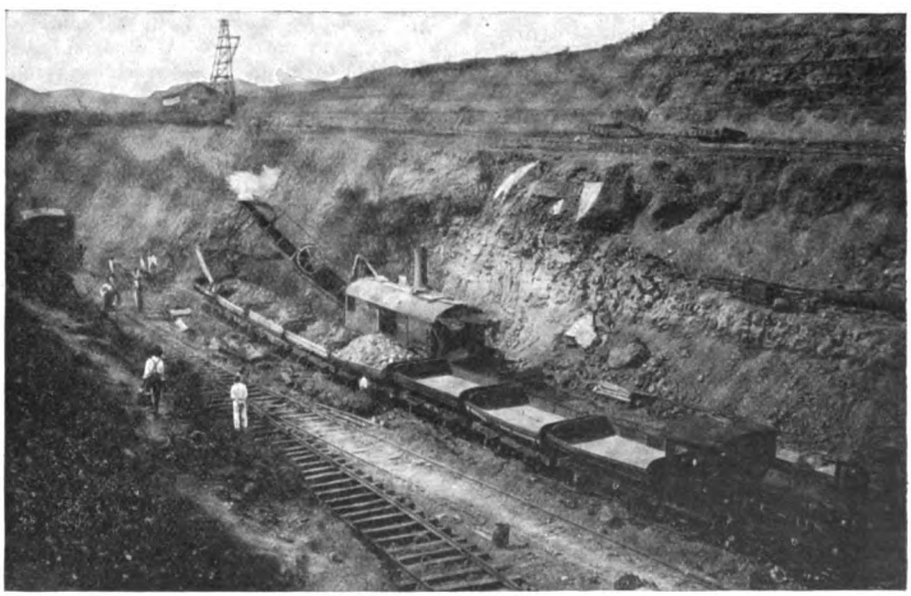
Thornton's Letters.—5.

Being "Straight-from-the-shoulder" Talk from a Prosperous Self-made Smith to his Former Apprentice now in Business.

DEAR JIM:

Your last letter was a little off color, my boy. Oh, yes it was written on white paper with black ink, but it was a deep blue just the same. Now up to this time, I've thought things were going along fine with you, but, while you did'nt say anything that would lead anyone to think otherwise, reading between the lines tells me that something is wrong, and in looking over your previous letters I am inclined to think that collections are slow. I think that is it. If I am wrong then this letter will have been written for nothing.

In the first place, Jim, don't ever lose sight of the fact that many a larger man than you has gone down because of slow collections. Many a business ship has floundered and been lost in the sea of bad accounts. Don't forget this, Jim, and when you are inclined to be easy with your owing customers you'll forget everything but your end of the deal. This may be a cold-blooded way of looking at it, but it's the only way to collect bills. Of course, Jim, I don't want you to be so danged stubborn and unaccommodating that people will dislike you. But I want you to succeed and you can't if you are loose in your collections. When you give credit put a limit on it. Send the bill promptly, keep the account posted up to the minute, and when payment is'nt made on



THE GREAT CULEBRA CUT ON THE PANAMA CANAL. HERE IS SHOWN ONE OF THE GIGANTIC STEAM SHOVELS AT WORK FILLING CARS

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promised date, let your customer know that you are right on his heels—but be sure you are. Don't let him think you've forgotten his little bill.

Talking of collections reminds me of Tom Burton, who kept a feed store down our way. Seems to me now that everybody in the town owed Burton. But he got his money, maybe had to wait awhile in some instances, but he got it. How'd he do it? Well, he always carried a little book with him with a summary of his outstanding money. When old Bill Jones says at lodge meeting that he'd pay his bill if he knew the amount, Tom simply pulls out his little book and tells him that he just happens to have a memorandum of the amount and will give him a receipt. Of course Jones has to come up with the coin or feel mighty foolish.

But it's best, Jim, not to trust the people you can't trust. Get your money in advance from the doubtful ones, and see that you're not working for a dead beat when a good customer wants you.

When you get this letter, Jim, I want you to make out bills for everyone of your customers and get after collections with a sledge. Keep at it, too. I want you to make good, Jim, but you won't if you disregard the business end of your trade. It's all right to be a good smith and a good workman, but that's not all; you've got to be a business man, too. These are mighty prosperous times, Jim, and you want to make hay while the sun shines. Get after your customers when they've got money and keep after them hot.

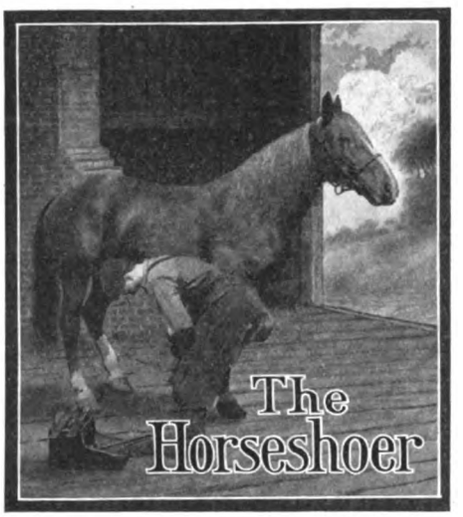
Yours,

Thornton

The Making of Plow Points.

A. W. SHORT.

First, get your stock for bar of share or short land slide, owing to size of plow. Cut it reverse to the level of plow or, in other words, lay your pattern on the outside of stock. Cut level to fit pattern, and after this take hot chisel and cut about two-thirds down on short side of level, in order to forge a flange for welding share. After this, clamp bar on plow, get out your share, sharpen and fit up to bar while clamped on plow. Now turn point of share under, lay share on bar, mark across edge of share and down on bar to make a fit. The bar is now taken off and the two corresponding marks laid together; clamp with a pair of tongs made to catch the bar and top of share, holding them firmly together. Now catch share at the top, take first heat at point, and after this reverse and fit up share on plow. Then catch at point with tongs, take your heat at top, weld on top, turn over and weld up flange on bottom with a straight hammer. Then, while heat is in, put on share to stock and drive it up to fit. It is best to use soft steel for bars, in order to forge the flange; also cut bar thin at point, in order to forge it down broad, say 1¼ to 1½ inches. In making shares, always get your stuff to fit before welding, and do up-setting after welding, or with the same heat. Making shares is nice work when properly done. I have tried several plans, but this is by far much better than any I can scare up.



To cure corns, I cut them until I draw blood. Then I fit the shoe and plug the hole with tar and oakum. A corn treated thus two or three times will soon disappear. A. C. HALEY.

Don't ever pare the frog.—If it seems hard, dry and prominent, 'tis far better to apply moisture in some form and allow it to wear away naturally. While it may be excusable to remove the loose pieces and layers of horn, which form no protection for the frog, it is best never to touch the knife to this part of the foot. F. R. KNUTT.

The removal of horn from the foot to be shod, should be neither too little nor too much. Either is likely to cause injury. If you have made a careful examination of the horse, his legs, gait, etc., you will know just what to cut and what to leave. Never cut at random. Know before you pick up your knife just what you are going to do with it. D. T. G.

Hot and Cold fitting have received much attention in these columns. My way is to fit hot, but not a red hot, so it will burn into the hoof or cause pain or injury. I simply have the shoe hot enough so as to seal the pores of the hoof and retain the moisture. I have noticed that when you pull a shoe that has been fitted hot that the hoof is soft and cuts easily, no matter how dry the upper parts may be A. C. HALEY.

Clips and lameness are seldom connected by the average shoer, yet it is very easy to hammer a clip down and cause it to press excessively on the sensitive foot. When side clips are used, they hold the foot as in a vise—do not hammer them down too much. Care in the use of both toe and side clips is absolutely necessary. If you have a habit of hammering them down on the wall to make them look neat, stop the practice and see if you won't have less lameness in your horses. G. L. RUTTEN.

The standing position of a horse does not always indicate the way he travels. The careful shoer will observe minutely the action of the animal when in motion before he attempts to drive a nail or shape a shoe. A front, side and hind view is necessary before the animal can be shod scientifically. I wonder how many readers of this article have their sign read "scientific shoeing" instead of the time worn "Practical Horseshoer?" It's time this latter phrase was discarded or really lived up to. A. P. P.

Shoeing with tips requires more care than ordinary shoes, or rather the application and use of tips. As the tip protects the toe only, this part of the foot is very liable to grow extremely long compared with the other parts of the foot. We use tips in some cases of lameness and find them successful where other methods have failed. When the hoof has not sufficient extra horn to allow cutting a groove for the tip, we use a tapering tip which is gradually thinned toward the heels. This makes unnecessary the cutting away of any horn and protects the toe, while the heels and frog are allowed their natural position on the ground. A. R. T.

Practical Points on Shoeing.

S. W. SHORT.

The case many have to shoe is a mule with crooked feet. First cut away the horny crust in line with the limb, so his foot will set flat and not crooked, and be sure to let the frog down on the ground. Don't cut away the sole as many do, nor the bars that brace the foot. And don't cut the frog, the life of the foot. Now take the shoe and fit it to the foot (not hot) and be sure it fits the outside wall, to where the wall stops. Then drive with as small a nail as will hold the shoe 30 or 40 days. All shoes should be beveled on the inside just enough to take the pressure off the sensitive part of the foot, but not enough to let gravel and dirt under the hoof. The heel of all shoes should be slightly beveled to the outside so the foot can have good expansion.

All diseased feet have some cause, and shoeing is the cause of a big percentage of such diseases. Much lameness is caused by cutting away the toe to fit the shoe. This weakens the wall and places the pressure on the toe of the ospedis, which tends to crowd the ospedis backward and naturally cramps the foot. Be sure you make your shoe fit the foot.

If you never saw the inside of a house (only the outside) could you build one? Can you shoe a horse correctly, not

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knowing what or how it is made? Have you any idea how much damage you might do? If it was done right, would you know it? My advice to all shoers who know nothing of the anatomy of the foot is to study it now.

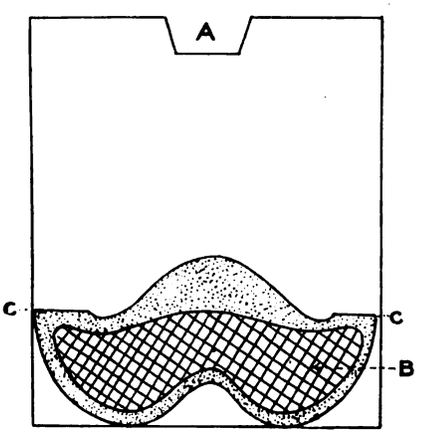
A Talk on Pads and Their Use.

W. J. BARNES.

I shoe some of my customers' horses with frog, bar and occasionally half ring pads. The frog pads are, of course, easy to fix, but care must be taken to see that the rubber frog fits quite tight between the heels of the shoe, otherwise, in my opinion, they are of no more use than an ordinary leather.

Regarding bar pads, I fix mine the following way:

First I fix my shoe, taking care that the shoe is left a little longer than required. Then I take my pad and place it on the foot, the rubber, B in the engraving, where it is finally to be fixed, and mark the leather at the clip hole and cut it down to the mark, to insert the clip at A. Care must be taken when the pad is fixed, that the clip hole A is flush with the front of the foot, where the clip is, and that the rubber part B is where it is desired. Then place your shoe on the pad, the clip in the clip hole, and mark straight across from C to C. Now cut the shoe off at the marks. If the shoe is left a little long, ease the rubber. If there is a rough end left, do not file off, but leave it, as that will catch the rubber and hold it



THE RUBBER FROG SHOULD FIT TIGHTLY BETWEEN THE HEELS OF THE SHOE

firmly. This done, fix your pad and shoe together in the vice and trim. It will be found that if the pad is dipped in water the nails will pierce the leather more readily than if left dry. And they are bound to dry out after being in stock for a few weeks. Before cooling the shoe, if frog or bar pads are to be used, I set my clip about one-eighth of an inch forward on the foot and also open the shoe the same distance. For half ring pads, I see that they are rightly wedged between the heels, but I only open the shoes one-eighth of an inch and do not set the clip forward.

For dressing, I use either Pollard's, middlings or fine brand, mixed with good Stockholm tar. This must be mixed very stiff or it will squeeze out. Do not forget to place some tow (oakum) in the center and side clefts of the frog to keep the dirt out.

I daresay now that the following hints on screw-calk shoes may be of help to my brother smiths. When screwing shoes, countersink the holes well before tapping. Then there will be no rough edge left. If not used at once, always run your screw in all the holes down to the shoulder before nailing the shoe. If the above hints are followed there will be no calks lost and no bad words used.

I am glad Brother Wherry, in the November issue, appreciated my few remarks regarding knee hitting, as I am a new subscriber and live over in the old world—England. It has given me great satisfaction for him thus to speak of me, who is a complete stranger. I quite realize what he is thinking of, when he says that my plans did not suit every case. It is the art of shoeing that tells us the best way to make a horse travel soundly and well.

Anatomy of the Foot and its Relation to Shoeing.

C. W. METCALF.

It is very evident that no intelligent work can be done in shoeing unless the structure and the method of the growth of the hoof are entirely familiar to the shoer. The best way to study the structure of the horse's foot is to get the foot of a dead horse and soak it in water for a week or two, when it may be easily taken apart. When the hard outer-shell has been removed the sensitive inner foot may be dissected by the aid of a sharp knife. By comparing Figs. 1 and 2 we get a good idea of the general structure of the foot. In Fig. 1, the fetlock joint (where the cannon bone meets the long pastern), is not shown. In Fig. 2, the cannon bone is indicated by A, the fetlock joint by B and the long pastern bone at C. This latter is the bone, which appears in Fig. 1 as I. The hard outer wall or crust is shown at A A in Fig. 1. Beneath this is the insensitive lamina and next to this, and lying against the bone, is the sensitive lamina. This is a mass of nerves and blood-vessels. There is also an insensitive sole, which is a kind of horny substance, and the insensitive frog at F F. Above lie the sensitive sole E and the sensitive frog G. The principle bones of the foot are four in number, I, the long pastern

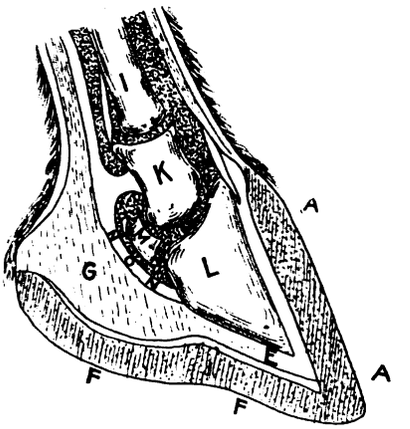


FIG. 1—SHOWING A SECTIONAL VIEW OF THE HORSE'S FOOT

K, the short pastern, L, the coffin bone, and M the navicular bone, over which the flexer preforans tendon, N N, works as a fulcrum. The seat of navicular disease is shown by O.

The hoof is not absolutely regular in form and each of the four feet shows some peculiarity by which it is possible to tell at a glance whether it is a fore foot, a hind, a right or a left. The fore feet are less pointed at the toe than the hind, but more sloping. The fore feet and the hind feet should be evenly balanced and nearly alike. The right hoof is distinguished from the left by the fact that the outer border is higher and more prominent, while the inner is more upright. The general shape of a fore foot, viewed from the bottom, is shown in Fig. 3.

The thickness of the wall of the foot is variable. In front feet it is thickest at the toe and becomes thinner toward the heels. The slanting portions are always the thickest. The thickness varies at the toe from three-eights to five-eights of an inch. The wall consists of three layers, the outer layer a varnish-like covering that is very hard, the middle layer, which is thickest and strongest, and the inner layer lying in parallel horn leaves corresponding to the surface of the sensitive hoof. This inner layer is always white, even when the rest of the hoof is dark. The horny sole is about as thick as the wall and covers the bottom of the hoof, curving upward into a hollow of the coffin bone. Normally it does not touch the ground. The lower side is rough and often covered

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with loose scales of dead horn which peal and fall away. The upper side is covered with velvet-like tissue which secrets the horn that goes to form the hard sole. The white line marking the junction of the sole and the wall is formed by the inner layer of the wall of which we have spoken as being composed of horn leaves that are always white. This white line may be traced all around the hoof, and even up along the bars to the frog, and is soft and crumbling so that in places it may disappear. Usually it is of a dirty white color, due to discoloration from manure dirt and iron rust. It is quite important, as it shows the thickness of the wall and marks the line to which the nails should penetrate.

The frog is a projecting horny formation lying on a thick fleshy cushion from which it is secreted. The frog lies as a wedge between the outer edges of the bars, or turned in portion of the hoof, with both of which it is united. The frog is very elastic and is divided by a cleft in its middle. On the upper side, just over the cleft, is a small projection called the frog stay, since it fits into the planter cushion and steadies the frog when the horse's feet are unshod. The frog, sole, bars and the bearing edge of the wall are almost level, so that the lower side of the hoof is nearly flat.

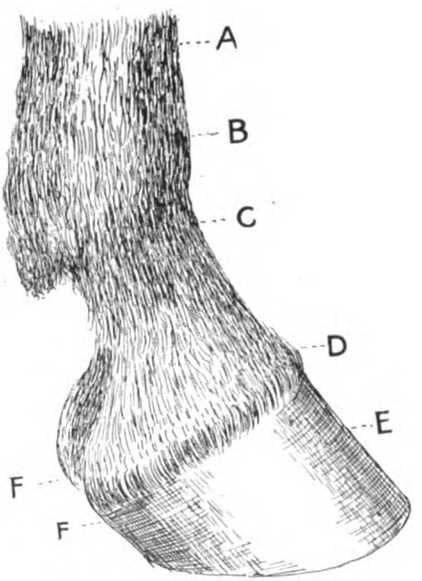


FIG. 2—THE POSITION OF THE FOOT BONES AND THEIR RELATION TO THE EXTERIOR APPEARANCE OF THE FOOT

The other horny portions of the hoof, composing everything except the white inner layer, are fibrous in structure and have tubes which run downward parallel with the general direction of the hoof. As a whole the tubes forming the sole are smaller than those in the wall, and those in the frog are smaller still.

The coronary band, lies under the frog band, but above the sensitive lamina. It consists of a convex band ⅛ of an inch wide, extending entirely around the hoof from one heel to the other. It is more convex in front than at the back, and at the heels is flattened, and this part is called the bar portion. The coronary band secrets the principle part of the horny wall, namely, the thick middle layer, and forms a cushion for its union with the fleshy tissues. This sensitive structure is a perfect network of blood vessels and nerves and the horse is thus enabled to feel the slightest pressure or touch on the outer horn covering. In disease this sensitiveness causes a great deal of trouble.

A Few More Don'ts.

WM. F. PARRISH.

Don't worry because your customers do not pay you but go after them.

Don't ask for more than your work is worth, but stand for the right price.

Don't ask your helper to drink with you. Try to make him look up to you.

Don't cut prices. You are not only injuring your competitor but also yourself.

Don't run your competitor down; if you can't say a good word for him, keep still.

Don't think because your competitor is getting more trade than you that he is cutting prices.

Don't go into the street to solicit trade. Do your soliciting through the quality of your work.

Don't tell a man you can do his work in half an hour when you know it will take twice that long.

Don't trust everybody that comes along and then say you can't see why you don't make money.

How to Temper Mill Picks.

V. W. WENDLICK.

The following are three very good receipts for tempering mill picks. The brother smiths can take their pick.

Receipt No. 1: To six quarts of rain water add 1 oz. of corrosive sublimate and two handfuls of salt. When it is dissolved it is ready for use. The first ingredient gives the steel strength, while the second gives it hardness. Some smiths prefer 2 oz. of salammoniac added to the above. In preparing the pick for hardening, care must be taken not to overheat the steel or to hammer it too cold. Never heat more than two inches at any time. When ready to harden bring the pick to a cherry-red, then dip, but draw no temper. Keep dipping vat covered and labeled, as this solution is very poisonous.

Receipt No. 2: Take one cup of salt, ½ oz. of saltpetre, one teaspoonful of pulverized alum and one gallon of rain water. Heat pick to a cherry-red and dip, but draw no temper.

Receipt No. 3: Two oz. saltpetre, 2 oz. pulverized salammoniac, 2. oz. alum, 1½ lbs. salt and 3 gallons of rain water.

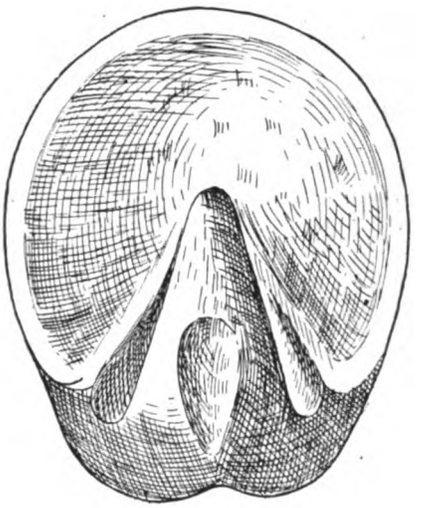


FIG. 3—AS THE BOTTOM OF THE HEALTHY FOOT SHOULD APPEAR

Use the same as above. Don't hammer picks too cold nor overheat them. To make picks look like silver, mix in the solution one shovelful of burnt bark of white ash.

A Few Words to the Helper.

WM. F. P.

Never say "That's good enough" until you have made the work satisfactory to the party who is waiting for it. And be careful that it does not take more time than it should. Take an interest in the business of your employer. It will be to your own interest in the course of time for, you not only help your employer increase your salary, but you learn a great deal more about the work. And remember that the blacksmith, instead of being looked down upon, should be looked up to as the greatest of mechanics. The fault of the trade has been the failure of the blacksmith to hold himself to the place where he belongs at the head of the mechanical line. He has allowed himself to drift until he thinks people look down on him. Carry yourself straight, be honest, stay away from the saloons, and give gambling a wide berth. Remember that it is your duty to be on time at the shop, and to keep the shop clean. By heeding these things you will help to raise the standard of the craft to where it should be.

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And to raise the standard of the craft should be the aim of every true craftsman. Let every member do his best to bring the craft into better standing than ever.

A Shop-Made Tirebolting Machine.

J. J. UTZ.

The tirebolting machine shown in the engraving can be made by any practical smith. The tool is shown assembled and in operation at A. The cog wheels shown at J can be taken from an old wash wringer. The handles B and C are of -inch round stock and 12 inches long. The handle and crank at D is made as shown, the shaft being made of such size as to go into the handle B easily. This shaft is threaded and squared at one end to receive one of the cog wheels, and then a nut to tighten the wheel to shaft. The piece shown at E is the part which holds the nut when the machine is in operation. Several sizes of these may be made so as to operate on any size wheel. The handles B and C are fastened or joined with a ¼-inch rivet.

To operate the machine, fit the required nut piece into the tool, insert the nut into the nut holder, press the handles together, getting the point of handle C directly on the head of the bolt. Now turn the crank of D, and the nut is quickly run on or off. This machine is a time and labor saver, and every smith doing vehicle work will appreciate its usefulness at a glance.

Thermit in the Railroad Shop.

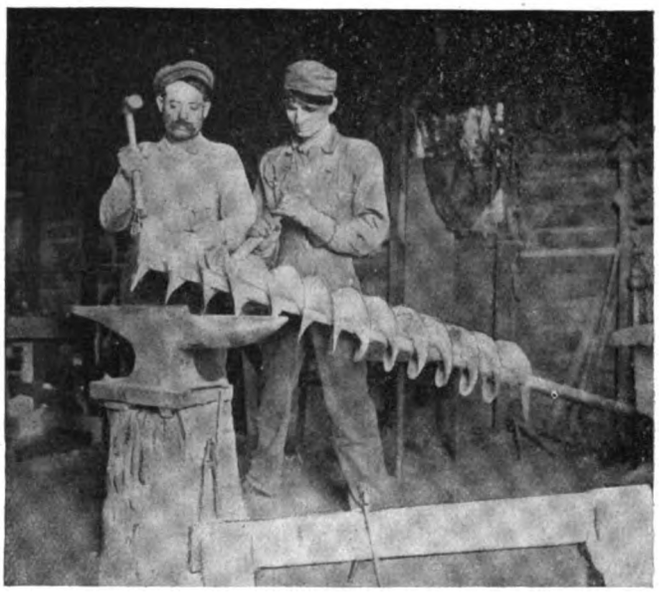
ARTHUR STOCKALL.

In the first place I made some tests with Thermit metal. I took a piece out of the pouring hole of the mould and drew it out under the steam hammer until it was ½-inch square and 16 inches long. I then took two pieces of refined iron of the same length, one piece ½-inch square and the other ⅝-inch square. We put them all in our testing machine and pulled till they broke. The results were -as follows:—Thermit, 9½ inches between jaws of machine, metal began to stretch at 12,000 pounds, elongated ¾-inch and broke at 16,300 pounds. The ½-inch square iron, the same length as Thermit, 9½ inches between jaws of machine, began to stretch at 9,360 pounds, elongated 2¼ inches and broke at 13,340 pounds. The ⅝-inch square iron, 9½ inches between jaws, began to stretch at 14,000 pounds, elongated 2 inches and broke at 22,670 pounds.

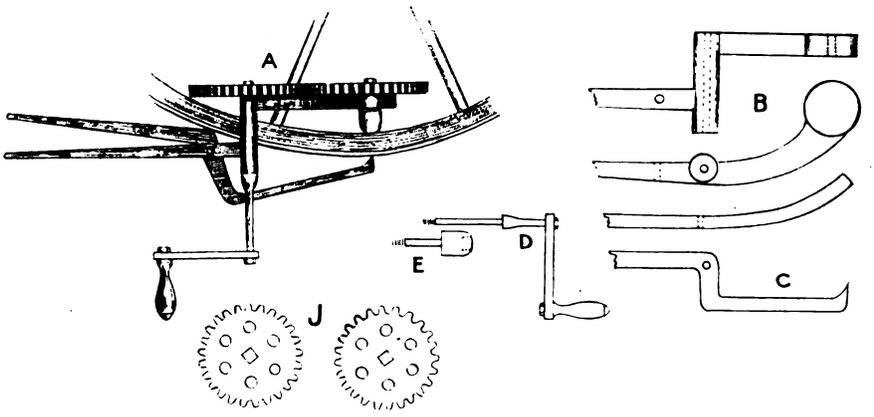
By this test, taking the area of bars into account, the Thermit metal shows a decided gain over refined iron in stiffness, and a slight advantage in tensile strength. I then took these same pieces and bent them double, cold. The iron broke in two, but the Thermit bent over with no sign of fracture. I then took another piece of Thermit, heated it red hot (by the way, it will stand but a very low heat) bent it over flat, and then straightened it back again. It came almost straight before it gave way. So I think I can say that Thermit metal is better than iron, and as the method of using it is improved, the Thermit powder is toned down so that it will just have sufficient heat to do the work required of it.

The result of my observations on Thermit welding is that it is not a weld, but is more in the line of a braze; that the article to be mended must be heated to a red heat if possible, and in the case of wrought iron or steel locomotive frames, must be jacked apart ¼ or ⅜ of an inch to allow the metal to run freely between the ends of the fracture. It must then be drawn up by straps or some other way while the metal is liquid, or very soft, so that all air holes may be closed up and the metal become dense and nonporus. This also brings the ends of the frame together and acts on them in the way of a jump weld. The parts to be joined must be clean and the surface of the parts forming the band must also be filed bright.

Sprinkle powdered borax, after heating on the outer end or all over, for that matter, of parts inside of mould. This will do no harm. It may possibly do a lot of good in helping to stick places that may not be hot enough to stick. Judgment must be exercised in making your mould and in placing the same to have the best results. Divest yourself of all prejudices and preconceived ideas, and take hold of this method as something new and scientific of which you know nothing and have everything to learn. All new ideas ought to have a trial by the progressive workman without prejudice. Let this have its chance.



TWO STURDY SMITHS OF KANSAS, MR. A. D. HULING AND SON, AT WORK IN THE SHOP



A SHOP-MADE TIREBOLTING MACHINE EASILY MADE

A Sled Brake of Years Ago.

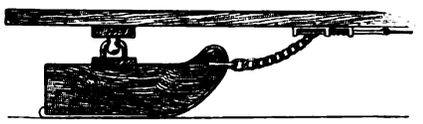
OLD BOY.

One of your subscribers asks about the making of a sled brake and while the occasional pumping of the bellows

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was as far as I ever got in the mysteries of smithing, the accompanying sketch of a sled brake may be of interest. This style or pattern was largely used on the large coasting bobs of 15 or 20 years ago, in the hilly country round about the Mohawk Valley (New York State).

This brake consisted of a chain fastened to the heads of the rear bobs



A SLED BRAKE USED ON COASTING BOBS

and was held up, when not in use, by a spring catch. This catch was controlled by the young man at the tiller or stearing gear, who pulled the lever and dropped the chain when the bob was to be stopped. The engraving needs no explanation, as the working of the contrivance is self-evident.

As some of the coasting roads led across railroad tracks and public highways, it was absolutely necessary to have some device of this character to insure the safety of the coasting party. This same device may perhaps be useless to the reader in question, but may serve as a hint for something better.

Back Dished Wheels, a Bow Socket Rivet Tool and a Brake for a Sled.

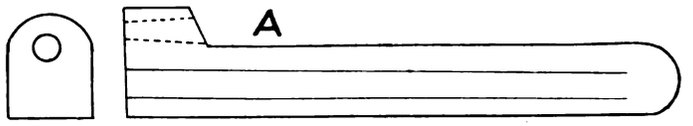
W. H. OBLAD.

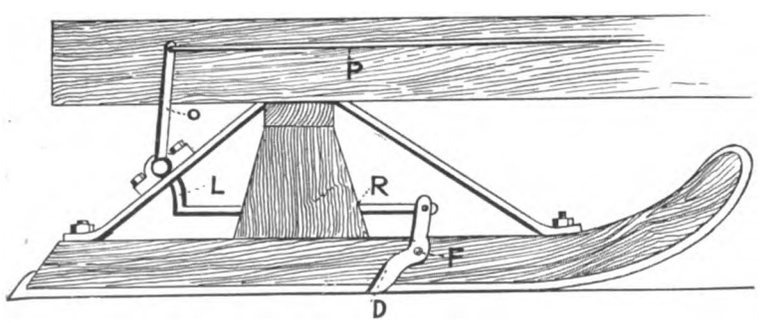
Brother Bupp, in the August number, and Brother Hellersteadt, in the October number, have trouble with a wheel that is dished the wrong way. If your valuable paper will allow me the space, I will give my way of doing the job. Take any buggy or spring wagon wheels, no matter how twisted the rims may be towards the inside, and treat them as follows:

Take off the tire and reverse the rim, or, in other words, put the inside of the rim to the outside. Then saw a small piece out of one of the joints, upset the tire until it is quite tight and replace it reversed. (Have inside to outside). After 15 years of experience at this trade I have yet to find the first wheel that did not yield to this treatment and stay to its proper dish.

A tool for knocking rivets out of bow sockets, is made of seven-eighths or one-inch octagonal steel, from 18 inches to two feet long when finished. See A in the engraving. The hole in the end must be the size of the rivet head and tapering toward the back, so that the rivet will fall out easily. Upset one end of the steel until it is one by one and one-half inch face. In removing the rivet have the helper hold this backing bar against the rivet head and, with a center punch to start it and a small drift to finish, punch it out. This tool avoids breaking the lug of the center bow, as will sometimes happen without something to resist the blow.

The sled brake is illustrated at B, and needs little explanation. The drag D is fastened to the runner at F and is operated by a lever L and a rod R. The lever L is in turn operated by a rod O and a rod which goes to the drivers seat. The brake drags are fixed on each rear runner, there being two for each runner, one outside and one inside.





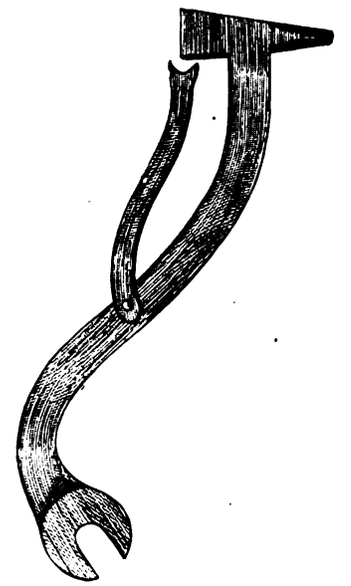
A BRAKE OPERATED BY THE DRIVER AND ACTING ON THE REAR RUNNERS

The rod P is operated by a hand or foot lever at the driver's seat, thus bringing the brake under the direct control of the driver of the sled. It is necessary, of course, to make all parts of this brake from good solid stock, so as to guarantee the reliability of the contrivance at the critical time.

Three Tools in One.

HIRAM R. EBY.

The accompanying engraving shows a very handy little tool which every practical smith will appreciate on sight. It is a combination of an S



A COMBINATION TOOL THAT SHOULD BE OF VALUE TO THE PRACTICAL SMITH

wrench, a punch and a clip tongs. Any smith can forge it in a short time and will find his labors well repaid by a very convenient combination tool. The wrench end or part to receive the nut is bent as in an S wrench. This makes it especially convenient for ironing a gear or for turning nuts and bolts in tight corners. The punch end is hardened and serves very conveniently.

The Repairing of Steel Cars in the Repair Shop.

A. F. SMITH.

There is one particular branch of railroad work to which I would like to call attention; I understand it is taken care of in the boiler shop in some of our railroad shops, but I cannot see why it should not come under this head. The subject I refer to is, or will in the near future become, a serious one with some of us in the repair shop. It is that of repairing steel cars. There is a field for your specialist, for I believe a specialist in this department can do more and better work in an hour than a man not familiar with the work could do in a day. I wish some of the men would give us their experience with this kind of work; it would possibly not interest all, but I am sure there

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are some who have said things which would not sound well in this paper, when they were called out to inspect a steel just shoved in for repairs.

The Horseshoe as an Emblem of Good Luck.

In the latter half of the seventeenth tentury, a writer mentions that most of the houses in the west end of London were protected against witches by horseshoes nailed on them. As late as 1813 there were seventeen horseshoes nailed up in one London street, but in 1841 only five remained.

Only a few years ago, the story was published in English newspapers of a carpenter in Ely who, when taken ill, imagined that a woman whom he had ejected from one of his houses had bewitched him. Certain wise old women counseled him that the only way to secure protection from her supposed incantations, sorceries and evil influences was to have a blacksmith nail three horseshoes over his door.

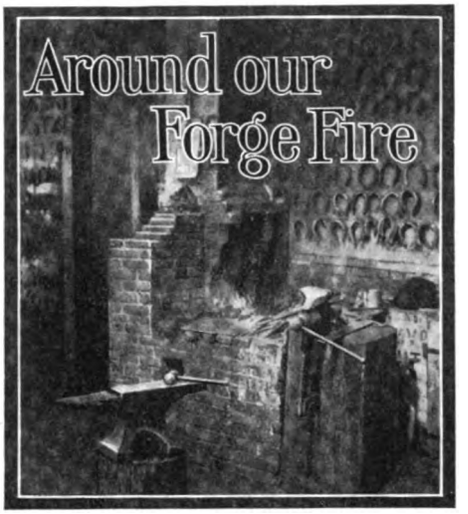
This was done and the supposed witch was so enraged that she complained to the dean of the cathedral, but he only laughed at her. Enraged at her failure to secure relief from what she regarded as intolerable condition, she hurried to the bedside of the sick man, despite the horseshoes over the doorway. But the sick man and his advisers had their faith restored when they found that the economical blacksmith, instead of using horseshoes, had nailed up three of the shoes that had been discarded from a donkey's feet.

But the days when horseshoes were nailed over the entrances of houses to keep away witches has passed away with the belief in witches. But the use of the symbol has not died out, as the tiny golden horseshoe dangling from a watchchain, or the diamond incrusted one on the bosom or hair of beauty testifies, and the belief in the luck of picking up a castoff horseshoe in the roadway, is shown by the frequency which it is gilded and hung up, and perhaps adorned with ribbons.

A Trio of New Zealand Smiths.

N. MATHESON.

The accompanying engraving shows three American Blacksmith readers of New Zealand. We have the care of 160 heavy horses and the iron and repair work for a proportionate amount of rolling stock. We have two fires in constant use and make all our shoes in the shop. We have no power in the shop at present, but have a very helpful tool in our tire shrinker and welder. We could not do without this, especially on the tires four inches wide by one inch in thickness.



"Say, Benton," said the Editor, as that worthy entered what the Editor now calls "The Shop." "I haven't had a suggestion from you for weeks. Is the paper getting so crackin' good that you can't improve on it, or are you at fault?"

"Well," replied the other after removing his coat and making himself comfortable near the fire. "I don't mind telling you that I had'nt thought about any improvements. You see, since the new volume, you've spread yourself in such style that I thought we had just about as good a paper as we could get." Benton delivered this speech between puffs in attempting to light his pipe.

"It's a pretty good paper, I know" returned the Editor, "but I want to make it still better. I want you to bear this in mind; that I want a good suggestion from you and every other reader in the next few months."

The Editor spoke with such emphasis as to cause Benton to exclaim: "What's the matter? Isn't Our Journal the best in the field? Your request for suggestions would make one think that the paper was going down instead of up, as the elevator boy says."

"Oh, the paper is all right," replied the other. "We're improving every day, but I want suggestions. I want you to tell me just what you would like to see in the paper, and I want our readers to do the same. I want suggestions, hints, recommendations, and advice from every reader, no matter where he is located."



A TRIO OF NEW ZEALAND SMITHS WHO ARE INTERESTED IN THEIR AMERICAN BROTHERS

"Well it seems to me," said Benton, "that you take a big interest in your readers."

"Always did," returned the Editor sharply. "THE AMERICAN BLACKSMITH is published for the readers, and for readers only, and it's been smiths at the first table ever since we started. No matter whether a smith is located right here in town, or in the Fiji Islands, I want him to tell me just what he would like in his favorite Journal."

"By the way," said Benton showing marked interest, "Do you send the paper to foreign countries, too?"

"Foreign countries?" echoed the Editor. "We send papers to every English speaking country on the globe. We have subscribers in Great Britain, Ireland, Australia, Tasmania, New Zealand, South Africa, South America, Mexico, Panama, Phillipine Islands, and a number of other countries wherever American smiths are found. American Blacksmith readers are found in the icebound North as well as in the boiling sun of the Tropics. They are found beside the ancient sphinx of Egypt, as well as along the path of that most modern of gigantic schemes, The Panama Canal."

"I had no idea that you covered so broad a field," returned the other.' 'It certainly speaks well for Our Journal."

Whiting made his appearance at this point. As he looked rather blue, Benton enquired, "What's the trouble, Whiting? Your horse run away?" Whiting is a staunch horse lover.

"I guess you'd feel blue too if your gas engine had burst its jacket last night," replied the new comer.

"Don't you use an anti-freezing solution in the tank?" asked Benton.

"No, of course not. I've heard about them, and a couple of years ago, bought some patent stuff of a chap that called at the shop. Well, it came very near to eating up the engine. Naturally, I've fought shy of things of that kind. I've been satisfied to drain the water jacket in winter, but who thought it was going to freeze last night?"

"Chloride of lime won't hurt your engine,' put in the Editor, "and four pounds of it to the gallon of water, will prevent freezing at seventeen below zero."

"Well, I'll certainly use it just as soon as the engine is in running order."

"How are you going to fix it?" asked Benton, scenting a new kink for his book.

"I've fixed it and am just waiting for the cement to get hard. I used litharge and glycerine and expect to use my engine tomorrow."

"How do you use the mixture?" returned Benton.

"The litharge and glycerine are mixed to a thick paste. The litharge may require more or less glycerine, but what you want is a thick paste of the two. It sets as hard as the iron in a short time and is practically as good as before."

"This gives you a little vacation, then, doesn't it?" asked Benton.

"Yes," replied Whiting, "but not a pleasant one when the shop is full of work."

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Tonic for the Worker.

J. S. THOMAS.

Do you ever get weary and tired
Of work you constantly do?
Whether at the desk or in the shop
It all seems wrong to you.

If so I prescribe a tonic
That will work just like a charm,
And if taken in moderate doses,
'Twill never do you harm.

It may be you have a hobby,
Be it bicycle, horse, or gun.
Why not cultivate it a little
And partake of a little fun?

Take a day in the wood or mountain,
Along some beautiful stream.
Study nature in all her beauty,
That she may be what she seems.

Forget your cares for a day,
E'en the hour, the day and the week,
And when evening comes and you homeward go,
Your tonic will seem quite sweet.

Written expressly for THE AMERICAN BLACKSMITH.



It pays—cultivate the smile that won't come off.

A good start doesn't insure a good finish, but it helps a heap.

Definite purpose and persistence accomplish surprising results.

Prompt payment means payment when the bill is due, tell your customers.

There'll be a call for rubber tires this spring. Prepared for it? Get busy.

Take care of each day to the best of your ability and the future will take care of itself.

A good time is this to put in a side-line. Right now, just before spring—it means extra profit.

"As soon attempt to run a shop without iron as without My Journal," writes a Georgia smith.

'Tis by no means too early to plan for the spring rush. Take time by the forelock, not by the heel.

'Tis said that all the wood to be used at the Maritime Exposition, at Bordeaux, France, is to be fireproofed.

The cultivation of kindness may not yield a large crop of dollars, but it does produce a fine harvest of contentment.

"Each year's efforts should be to exceed last year's sales," said Thornton, in talking of expansion in business.

Many good wagons are spoiled by poor painting. Wonder how many poor wagon jobs are saved by good painting?

A pound of energy with an ounce of talent always did achieve greater results than a pound of talent with an ounce of energy.

The number shod in a day is one thing while the manner of shoeing is another. Better one horse scientifically shod than fifty done carelessly.

Lots and lots of smiths are preparing for a big season in automobile repairing. Will you prepare for this work and extra profit? It's business that belongs to the smith.

It ranked with the writing of poetry, when horseshoeing first came into vogue, and bishops, squires and even kings did not disdain to practice it. The first smiths were men of high rank.

Get right down to figures, if you don't think a raise in prices necessary. There's nothing more convincing. Then consult your neighbors, and ask the secretary for association forming plans.

Five hundred years is said to be the age of an anvil owned by a Washington smith. This piece of steel resembles an anchor more than an up-to-date anvil, and bears the date 1406. It has not yet been nicked.

"To slick up shop" was one of Tom's New Year resolves, and the other day we found that the back door, which had so long hung on one hinge, was lying in the door-way. Tom evidently intends to hang it properly someday.

The blacksmith-preacher, Robert Collyer, says: "Cultivate a good temper; lead a natural life; eat moderately of food that agrees with you and keep on the sunny side of the street." Pretty good rules to live by, don't you think?

It may be the best in the country—but who'll know it if you don't advertise your shop? And let your advertising be the best, too. Don't have the circular, business card or booklet yell out "Rags and Scrap Iron" before a word of it is read.

A poor business man, indeed, is the smith who cannot bring his shop into prominence on one pretense or another. If you haven't the best equipped shop in town, have the cleanest or queerest or warmest or the largest. But strive to outdo your competitors in one point or another. If you are the smallest, biggest, thinnest or stoutest smith, say so—get the people to the shop if only in curiosity.

One smith we know has two show windows in his shop-front, which faces on a principal city street. One of his recent displays was titled "From the Mine to the Horse's Foot." This showed the various stages of a horse shoe. Another display was an exact model of a wagon which is his specialty. Last week he displayed a collection of bolts, nuts, screws and all the iron work that goes on his special wagon. Still another display was the skeleton of a horse—this he secured from a prominent veterinary surgeon. He uses neat explanatory cards freely in his displays, and says his show windows are a good investment.

The automobile industry in America is less than ten years old, but today its product is worth as much as the output of all our piano factories, while it exceeds in value the fur trade, and is forty per cent. ahead of the ubiquitous and necessary sewing machine. It is estimated that thirty-six millions were spent last year for new autos, and twice that amount in running the machines, old and new, in existence. The rate of output is now a little more rapid than one automobile every five minutes. The increased expenditure for good roads, for country houses, and for all the things that automobiling makes necessary is simply uncountable.

At great expense several zebras have been imported to the United States for the purpose of introducing the zebroid, as the bybrid offspring of the horse and zebra is called. The zebroid makes an excellent all around animal for domestic use. It is already used in South Africa, where it has given satisfaction, says an exchange. The animals are much stronger and more vigorous than the horse and live about twice as long. They will rank with any of the horses in general use today and in value will range from $800 to $1000. They will be very tough and able to endure twice the hardship the average horse can stand. The parent of the zebroid on the horse side will be arranged from the full-blooded Arabian mare down to little burro jennies, through a list of horseflesh including piebald, hackney and mustang.

A Shoer who styles himself "The Horse's Friend" has the following "Don'ts" printed on the back of his business card:

"Don't be afraid to blanket your horse when he stands in the cold.

Don't fail to keep your horse sharp shod when the roads are slippery.

Don't force a cold bit into your horse's mouth—'twill take but a second to drop the bit into hot water.

Don't try to convince your horse that he has on skates when the roads are icy—go slow, or better, go to the shoer.

Don't forget to water your horse the first thing in the morning and the last thing at night—but not with ice water.

Don't allow your horse's feet to be touched by unskilled hands—bad shoeing spoils more good horses than any other one thing.

Don't forget that horses, healthy or ailing, gentle or vicious, good, bad or indifferent, are treated and shod scientifically, honestly, safely and well by "The Horse's Friend."

Nearly a million dollars was recently paid for the patent on a new method of making plate glass. Hitherto in making window glass the molten substance has been blown into cylinders and subsequently flattened, while in the making of plate glass the viscid mass was cast from the pots and rolled. The new invention draws the molten substance from the pot and conducts it between rollers lying side by side. Seventeen pairs of these are built up tower-like above the pot. The liquid mass cools on its way between the rollers and comes out from them polished on both sides, in any desired thickness (this being regulated by the position of the rollers), beautifully flattened and ready for use. This method is the invention of a Belgian. If the new

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invention possesses all the advantages with which it is credited it will cause serious damage to the blowing plate-glass industry as already established, in which great sums of money are invested and large numbers of specially trained and highly remunerated men are employed both in Europe and this country.

Why the Building of Shop-Made Tools is Encouraged.

This article is suggested by a recent query from one of our readers who asks, "Why do you encourage the building of home-made tools?" Our reason is that a shop-made tool or machine is in the majority of cases a labor saver, and it acquaints the craftsman with the advantages of up-to-date tools and machines. These shop-made machines will eventually be replaced by regulation factory-made machines which as a rule are more substantial and lasting. Take, for instance, a home-made power hammer. This tool while doing good work is not able to care for the larger and heavier work which the smith will eventually receive on account of his having a power hammer, and this of course, will necessitate his purchasing a larger and more substantial factory hammer. At the same time, the smith is becoming fully convinced of the advantages of modern tools and appliances, while using his simple shop-made machine.

Other instances beside the power-hammer may be cited, but this is sufficient to bring out our point, that shop-made tools and machines simply "pave the way" for improved equipment, and while they may appear as makeshifts, these same homely tools are assisting very materially in lifting the craft from drudgery and hard work. The fact that a smith makes his own tools and machines, shows that he is interested in his craft, and that he is willing and anxious to improve and enlarge his business.

Power in the Shop and the Machines Operated.

Power in the smith shop has done more to elevate the standard of the craft than any other one thing. Power of one kind or another has been installed in a surprisingly large number of shops and this number is being added to constantly. Of course it isn't the installation of a power unit alone that enables a smith to do better and quicker work with more profit. It's the machines he installs to be run by power. And while the shop-owner is not very likely to place machines that will not net him a good big profit, he can increase and add to his power equipment until able to handle most every kind of work that is likely to come to him.

There is little to hinder a smith from laying the foundation of a large smith and machine business. And, by gradually adding such machines and labor saving devices as will enable him to do better work in less time, along a certain line, he can easily forge his future in a growing town or community. All great things have small beginnings and with a good, growing, hustling town as a location, there is nothing to prevent a smith from enlarging and expanding his business to almost any size. And the biggest factor in this expanding is the smith's ability to choose and install such machines and labor-saving devices as are not only needed immediately, but whose need he can foresee. And in this connection let us again remind our readers not to disregard the horseless vehicles.

American Association of Blacksmiths and Horseshoers.

If the blacksmiths of this or any other country ever deserved more money for their work, they deserve it right now. The need of an advance in prices all along the line is becoming more and more apparent. Supplies of all kinds have advanced repeatedly, and if the smith has not advanced his prices in like proportion, he finds himself to-day working without profit. Just figure it out, brothers. How can the prices you are now charging carry their proportion of the expenses and leave you anything for living? How can you pay for rent, fuel, insurance, new tools, living expenses and the like, out of the prices you are getting for your work? Think it over brother. Take pencil and paper and figure it out.

The next step after a realization of the smallness of your prices is to remedy them, to raise them to where they should be. This is when the association comes to the rescue. Organization is the only thing that can save the craft. 'Tis the only means whereby a raise in prices and the other needed reforms can be made. Therefore, ask for plans for forming a branch association in your county. There's a need for one—you'll admit that. Then why not start things moving? You certainly cannot expect matters to form themselves into an association. You've got to make a start. But that is all it needs—simply a start, and things will move along as if by magic. It's our easy plans that do it, and your co-operation. They're as easy as can be, while they result in some astonishing reforms for the craft. Won't you write me to-day for these plans? Address me at The American Association of Blacksmiths and Horseshoers, P. O. Box 974, Buffalo, N. Y., and ask for my "Easy Plans."

Surely you are interested sufficiently in your craft to help yourself, and the trade. Just let me know that you want an association branch in your county—we'll work together until we get it.

By the way, I've almost forgotten to tell you that several more branches were formed during the past two weeks. One, after but two meetings, raised prices, and installed a system of "dead beat" protection. Now why cannot this be done for your protection? Shall I hear from you to-day?

THE SECRETARY.

On the Repairing of Automobiles.

DAYTON O. SHAW.

A spindle that was made one-half its length round and the other half square got to working in the hub. The square part was on the end. To repair this it was put into a lathe and the square part turned round, and to a taper, and a key way cut. This was not long enough, however, to interfere with the threads on the end nor the ball bearings. A new hub was now forged the same size as the old one and a taper hole was bored to fit the spindle. Another key-way was cut in the hub, the work put together and the key driven. The trouble was, however, not yet over, for the wheel had sprung out of line. The bolts would not go into the old holes, so four strips of iron were drilled and tapped, and bolts screwed into the pieces, two against the hub and two against the rim. These were opposite each other. The bolts were now screwed up and the rim was pressed into shape. This job gave good satisfaction.

The Forge Shops at the University of Nebraska.

PROF. C. R. RICHARDS.

The University of Nebraska, at Lincoln, has two forge shops; one, the engineering shop, located on the University campus and the other, the farm school shop, located at the University farm, three miles from the main campus.

The first of these shops was installed in 1893, and it was the first or one of the first shops in the country to be equipped with the well-known Buffalo down-draft forges. The general arrangement of the plant is shown in the accompanying engraving. It contains

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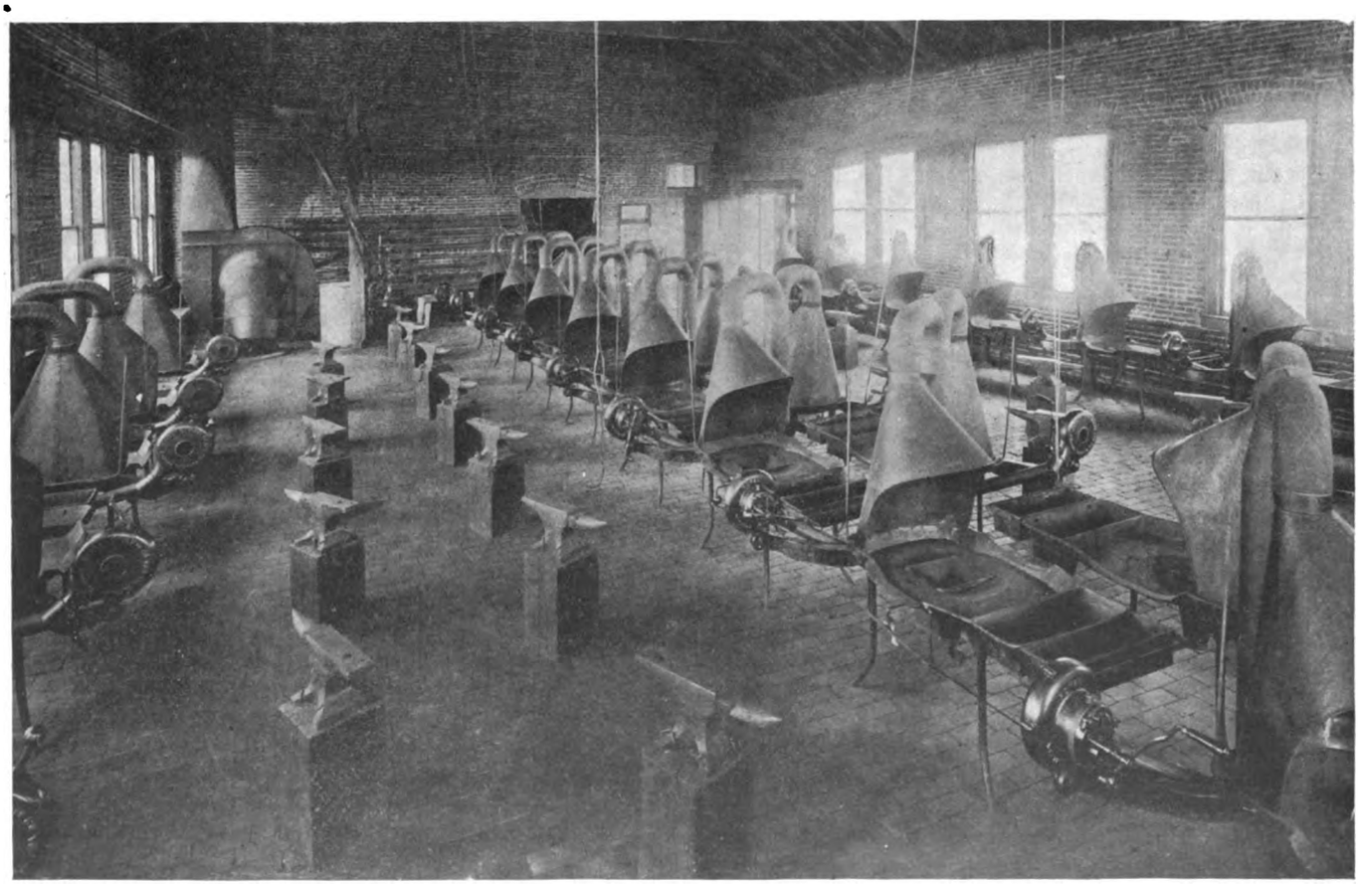
twenty-four of the smaller down-draft forges and one large size down-draft forge which is not shown. The exhaust and blast mains are made of vitrified bell mouth sewer pipe, carefully laid in Portland cement, these mains leading to and from a 70-inch combination or "double end" fan. The exhaust main is connected through an elbow to the side of the fan, and the blast main is connected to an outlet at the bottom of the fan. The top opening of the fan carries a steel smoke stack in which is placed an elliptical damper operated by a counterweight adjusted to control the quantity of air passing to the blast main and to the stack. At two or three points on the air pipes to the forges there are placed galvanized iron boxes with weighted lids to serve as safety valves, should inflammable gases accumulate and explode in the main. Occasionally a sharp explosion does occur, but damage, other than to one's nerves, is never done.

On the whole the outfit has worked well. During the thirteen years it has been in service there have been practically no repairs necessary. About once a year the blast main is cleaned out by opening all of the blast gates at the forges and closing the damper in the stack, thus forcing all of the air through the blast pipes. A considerable quantity of fine dust is thus blown out of the main. When a new shop building is provided on the campus, the writer proposes to install the forges with a separate blower and exhauster, as it is believed that a better adjustment of the exhaust and blast pressures can be secured, and as the dust trouble will be entirely overcome with the separated mains.

In addition to the regular forge equipment just described, this shop is equipped with a small hand forge for repair work when the fan is not running; a 200-pound steam hammer; a hand punch and shear; an emery grinder; a bench with vises; a stock rack and a large assortment of small tools.

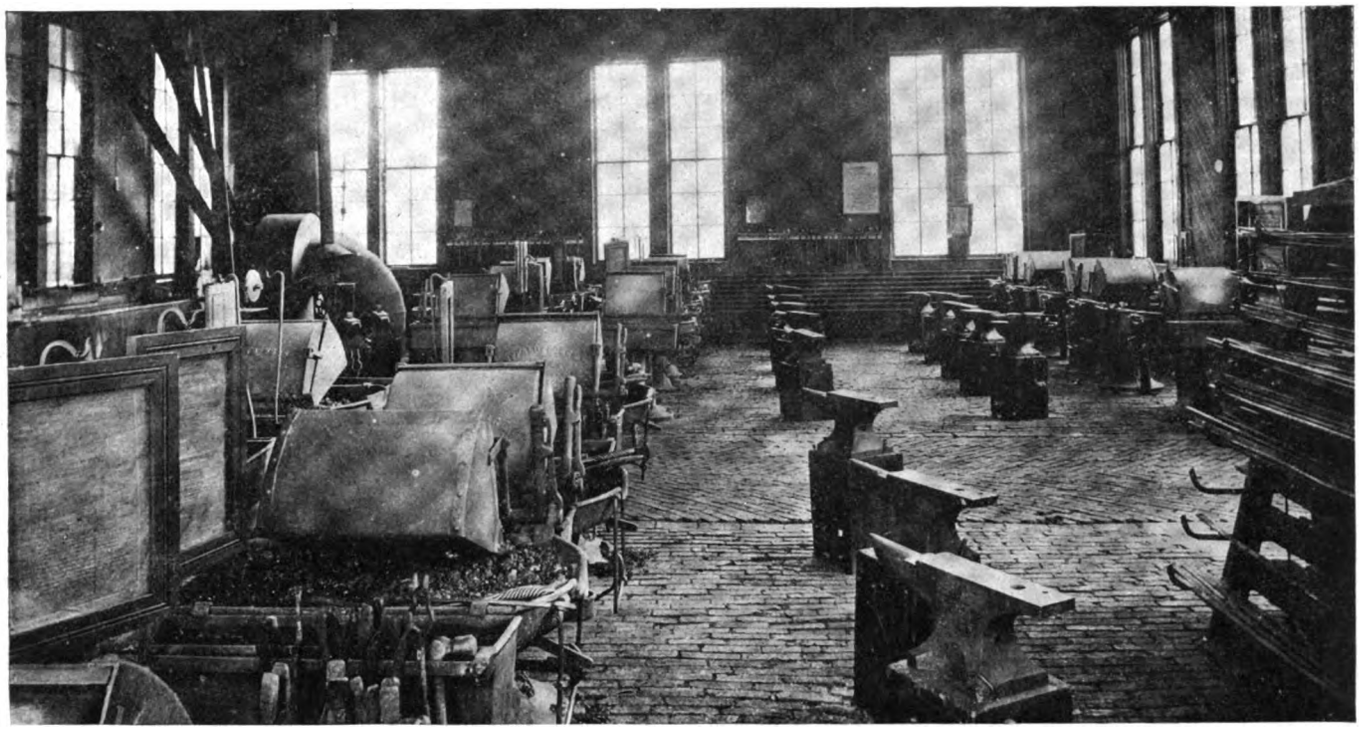
Instruction is given by the well known "exercise system," there being some forty exercises required in drawing, upsetting, bending, welding and tempering. All work is done from blue-prints, and the student is expected to execute his work with a close degree of accuracy. About 120 hours, extending over seventeen weeks, is devoted to the work. Lectures on forging tools and methods and on the manufacture of iron and steel are given in connection with the work in the shop. Of course it is not expected that the course will turn out finished blacksmiths—although it is surprising what an amount of skill is attained by many students—but the work is given to the engineering student so that he may become familiar with the materials used, the general methods of manipulating these materials in the forge shop, and finally that he can better judge of the quality of such work in practice. Technical schools would be glad if they could make finished mechanics of their students in the several branches of shop work taught, for the more complete an engineer's knowledge of mechanical construction in its different branches, the more successful can be become in his professional career. In the limited time available in the engineering course, all that can be done in the shops is to give some of the more important principles of construction with their bearing on machine design, etc., and a moderate amount of practice in the actual manipulation of the tools and materials employed.

Formerly the students in the Schools of Agriculture took their shop work in the University shops. While this school is an integral part of the University, it is located three miles from the University campus on the University farm. It was very inconvenient for the agricultural students to come so far for a part of their work, so three years ago a building was erected at the farm, providing quarters for a fine carpenter shop, a laboratory of farm machinery and a forge shop.



THE FARM FORGE SHOP AT THE UNIVERSITY OF NEBRASKA IS EQUIPPED WITH STANDARD HAND FORGES

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THE FORGE SHOP FOR THE ENGINEERING STUDENTS AT THE UNIVERSITY OF NEBRASKA IS THOROUGHLY UP-TO-DATE

The purpose of the course in blacksmithing for the agricultural student is to give him, as a prospective farmer, such knowledge of the work as will enable him to do the ordinary repairs about a farm. As with the engineering students, much of the work is given by exercises, although the course includes mainly those operations of value to the farmer, such as the forging of hooks, chains, clevises, wagon irons, the sharpening of plows, horse shoeing, etc.

In designing the shop equipment, the writer felt that the student should immediately become familiar with a standard hand forge, rather than with a power operated forge, so an equipment of thirty standard hand blower forges was installed. The smoke outlets from the regular hoods are connected by gooseneck pipes to exhaust mains of sewer pipe located under the floor, leading to an 80-inch exhaust fan. The room is thus kept entirely free from smoke, and the down-draft arrangement is particularly pleasing in appearance. The outfit has worked perfectly in every way. In addition to the regular equipment of forges, anvils and small tools, the shop has a blacksmiths' drill press, a hand shear, an emery grinder, benches with vises, stock racks, etc.

Making and Repairing Locomotive Frames.

J. FENWICK.

First have the scrap selected, piling the scrap on boards, each pile to weigh not less than 250 pounds. Heat the piles properly and shingle them into slabs 9, 10 and 12 inches wide, according to the size of the frame to be made. Whilst the slabs are hot cut them in three pieces and reheat them at once, and reshingle them into slabs for the frame back. By this manner you have a reasonable assurance that the fibres are running the right way, in the direction of the length, which is necessary to make the back as strong as possible.

Secondly—Pile as many slabs as you require for the back, which should be made in one piece. We always keep a pair of scales handy and put the slabs on the scales, put on the required weight to make the back, and then put the slabs right into the furnace. As I have already said, I do not believe in making the backs of frames in two, as the more welds you have in a frame, the more chances of a break.

Thirdly—When the slabs are hot and ready to be worked, care, of course, should be taken that you have a good heat in the centre, for, as you all know, how impossible it would be to carry the weight if you have to take a second heat; that is, with a heavy end, and a soft heat in the centre. Now, it must be understood that in forging the back, the pile has to be turned edgewise when you are taking down for the base or legs.

The legs should be made of the same kind of slabs as the back (that is repiled scrap), only shorter, having enough in each pile to make one leg. The braces are made out of scrap in similar manner to the back and legs, according to the stock required.

The forging of the front frames, or extensions, is done under the steam hammer; we never have to go near a smith's fire with them, and when finished at the forge they are ready for the machine shop. The braces should be welded with "V" welds, driving down the "V" well under a steam hammer, then using the thin piece of steel to close in the scarf.

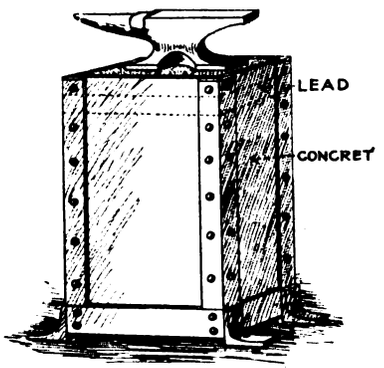
Now that the backs, legs and braces are forged, they are handed over to the smith, who takes hold of the back and welds on first the leg, making a female scarf on the back and a male scarf on the leg. Driving them well down, then turning them sidewise, use a thin piece of iron or tool on the side to weld in the scarf. After welding, cut out the fillet to pattern with cutters under the steam hammer.

The remaining legs and braces are put on as follows:—We get the back on the crane and heat it, while the leg is being heated in another fire. After getting the back hot, we take it to the hammer, cutting it so as to form a female scarf, returning it to the fire for a welding heat. We then take the leg to the hammer which has been heated at the end and form it into a male scarf; then take it back to the fire and get it welding hot. When both pieces are ready we run them under the hammer, driving them

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well down, and put them together. The other legs are then treated in just the same way.

When ready for the braces, we put in place and brace them to the back,



A GOOD PRACTICAL ANVIL BLOCK

the exact width wanted; we then put it in the fire to heat and then cut it out for a "V" weld.

Before closing this article, I want to tell you that we make our frames from scrap to finish.

Piling scrap, so much per pile.

Making slabs. so much per cwt.

Forging backs, so much per lb.

Forging legs and braces, so much per lb.

Forging front and extensions, so much per lb.

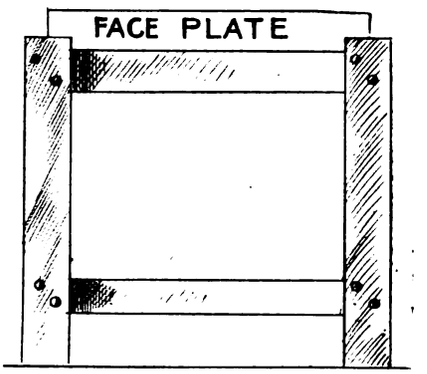
Making frames at fires, welding on legs, braces, etc., so much per weld. And, I can state that we do not have our iron frames cost (as some have said) more than the steel frames; but we make our iron frames in the smith shop, send them into the machine shop, have them planed, slotted, drilled and laid down in erection shop at a fraction of cost more than we have to pay for the rough steel casting, which has to be machined after, and I guess you all have a pretty good idea of what that will cost.

Last it year was stated that eventually the steel frame would be the frame of the future, for the reason that it can be produced much cheaper than the wrought iron forged frame, but it was not so good. Now I hope the parties who made this statement will come forward and tell us they are making them cheaper than they can buy the steel frames.

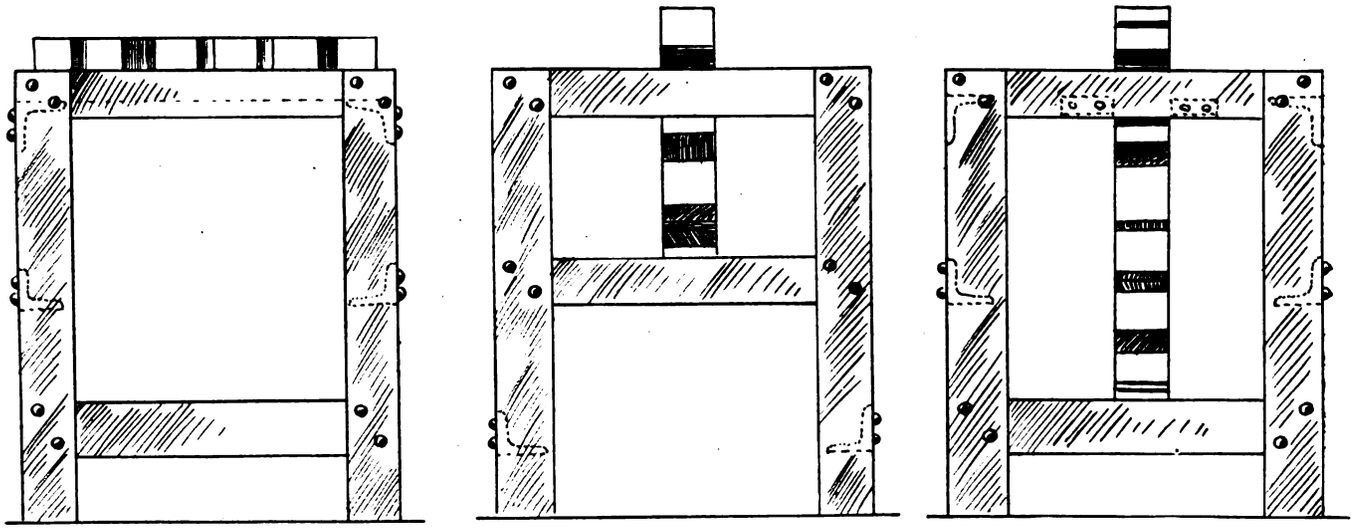
Regarding the repairing of locomotive frames, I take this to mean the best manner of repairing a frame in the smith shop. I do not think we have any business with the manner that they would put on the patch in the round-house—if asked we would give an opinion—but what we have to do with is the best and quickest way of repairing a broken frame when it comes to the smith's shop.

We have a great many different makes of frames on our road and of course, like all other large roads that are doing lots of business, we have our breakages and we always repair them in the smith shop. We have both steel and iron frames and both come in broken, but the largest percentages in broken frames are steel. Sometimes we get frames in that are worn by the spring hangers, which we take and fill up by welding in a flat piece in the worn out place.

It is not often that a steel frame breaks at the brace, but when it does occur, we treat it the same as an iron frame by welding in a V.



A FACE PLATE STAND THAT IS A CONVENIENCE



A STAND FOR THE SWAGE BLOCK THAT WILL PROVE VERY HANDY IN THE GENERAL SHOP

Several Good Practical Smithing Pointers.

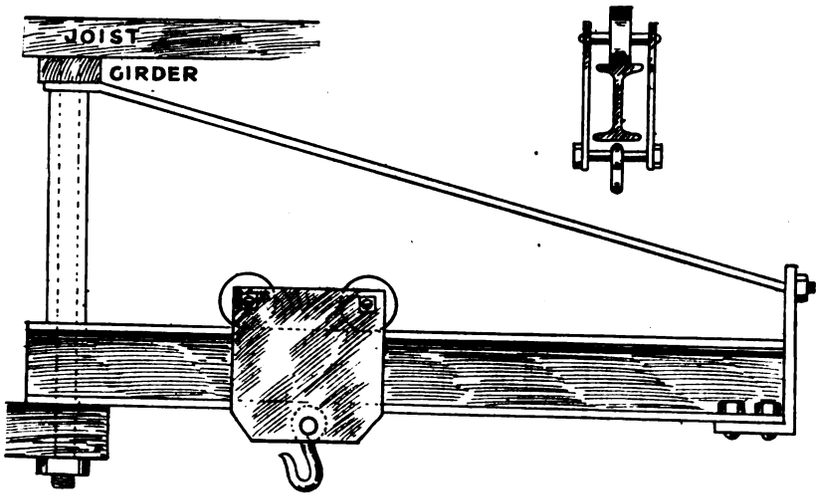
R. E. STEPHENSON.

First of all, I want to tell about the fire. It seems to me that a great many smiths have not as yet learned how to make or use a fire. They use green coal in the same old way that our fathers did. I have had very little experience with the coal fire. That little was when there was nothing better at hand. I have asked several who were "raised to the coal fire," and who were later converted to the coke fire, why people used coal. Most always get the answer,—"They have no better sense." I don't wish to criticise anyone, but would advise everyone to try our way of making fires: Take a piece of four-inch pipe, (smaller if the work is very small) and stand this over the hole of the tuyere iron and pack green fine coal (dampened so it will stick together) around the pipe with a sledge. Then take out the pipe and put the fire in the hole. You have a fire that takes less work to blow, will heat better and quicker, and won't burn your face. This wet coal will turn to good hard coke in half a day. You then take it out, and build a new fire; or use it all day, then dry it out and use the coke for next day. A fire built in this way will continue to make enough coke for the fire, and you have a fire

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that won't turn your eyes, and will not make much smoke. And it will give a better, cleaner and quicker heat.

We built a hand or portable forge



A CRANE IS HANDY WHEN HEAVY WORK IS TO BE HANDLED

which we can pick up with the crane and place anywhere, or put it in a wagon to take out on a job. We also have a handy device for a movable anvil. This is made of ¼-inch sheet steel with two by two-inch angle irons up the corners and four-inch angle irons around the bottom, with one flange resting on the ground. This steel box is filled with concrete, within two inches of the top. We then placed the anvil about one inch from the concrete and poured melted lead in till the box ran over. We now have a good, solid anvil that can be moved around quite easily.

We also built two cranes and many other things which are illustrated and need little or no comment. The swage block stand is a cheap, convenient device made of angle iron, with the exception of the straps around the top. The stand has four angle irons for legs, and other pieces riveted to these for the block to stand on. The short pieces for supporting the block when lying flat, also act as braces and keep the block from falling while standing up the long way. A face plate stand is also built on the same principle, but is only twelve inches high instead of 24 inches. The braces are of flat iron, as we never have occasion to stand it up and the plate lays on the braces instead of inside.

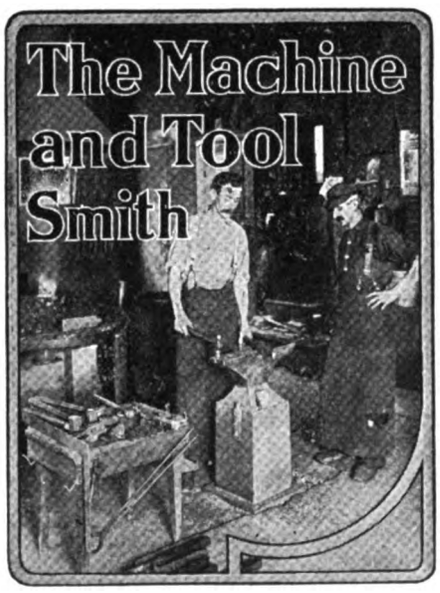
Prices in Yukon Territory.

W. L. MAINVILLE.

The following information regarding my shop, and the prices obtained for blacksmithing in the most northern point of this continent, may prove of interest to American Blacksmith readers. My shop, located at Dawson City, is 25 feet by 75 feet long, square front, and is located in the center of the business part of the city. I might mention here that I am the oldest blacksmith in business. I have all the newest improved tools, comprising electric motor for power, three power drills, one power hammer, two fires and a full woodwork equipment, etc. I built this shop seven years ago. There are only three blacksmith shops in this town, with one machine shop and foundry.

The following will give an idea as to the prices which we receive:

Horseshoeing, new shoes	$5.00
" bar shoes, each	2.50
Resetting	3.00



When tempering small taps we use a gas jet and a blow pipe. Of course it would be impracticable for large quantities, but for a few we find this method very satisfactory. Large quantities are usually placed in a kettle of oil and the temperature is taken by means of a thermometer. TAPS.

No one bath will answer for all classes of work. Oil of different kinds is used to accomplish different results. Tallow or lard is a very good bath for knife blades and all tools that should be tough as well as hard. For thin tools that require a sharp edge, linseed oil is found to be an excellent bath. J. LODER.

Carelessness should have no place in the dictionary of the steel worker. There is no excuse for the petty stumbles of some steel smiths. A line of doggerel comes to mind:

A new fire, a clean fire, a fire of heat and glow.
A good man, a careful man, a man of thought and go.

What more is necessary to the successful working of that particular metal, steel. B.

Welding Steel is a trick to some smiths. The most important thing to remember is to have a good, clean fire, and not to overheat the steel. Ordinarily borax will answer in joining this metal, but if not satisfactory, mix some fine steel borings from your drill with the borax. Use this mixture the same as plain borax. It will answer the purpose as well as some of these patented compounds and is quite a little cheaper. T. H. LAKELY.

Colors do not indicate hardness; they indicate the amount of heat in a tool. Only under certain conditions can you tell the hardness of a tool by the color. Any color can be drawn on a piece of soft iron. When drawing the colors, consider, the quality of the steel, the nature and temperature of the bath and the heat at which the steel was hardened. And do not attempt to draw the colors on anything after gazing into the bright fire of your forge. Neither attempt coloring in the sunlight. A. L. HILLNOR.

To harden long pieces without springing them, rough them out nearly to finished size, anneal to relieve strains and then finish to size. To keep the steel from springing while heating, heat slowly and evenly and turn the piece over often. Or heat it inside a piece of straight pipe. Or lay it on a straight flat piece of iron about an inch thick. This or the pipe, as the case may be, should be placed in the furnace first, and then the piece of steel placed on it, and the two heated at the same time. When hot enough, plunge the steel straight downward into the bath as quickly as possible. S. S. W.

Case Hardening Wrought Iron.

GEO. F. HEINKENS.

Wrought iron is nearly pure decarbonized iron and is not possessed of the property of hardening. Articles made from wrought iron may be externally converted into steel without depriving the interior of its natural character or structure. This process is called case-hardening.

The object of case-hardening is to obtain an external steel encasement with a core of fibrous iron. The effect is produced by a perfectly air tight box and animal carbonizing ingredients. The box should be of plate or cast iron from ½ to 1-inch thick, the size and thickness of the box depending on the articles. The articles are put in the box between layers of the carbonizing ingredients, the lid put on

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and hermetically sealed or luted with loam or fire clay. The box is now placed in a suitable furnace. The furnace should give a uniform heat of about 1350° F. Overheating is injurious, and will crystalize the articles or make them brittle.

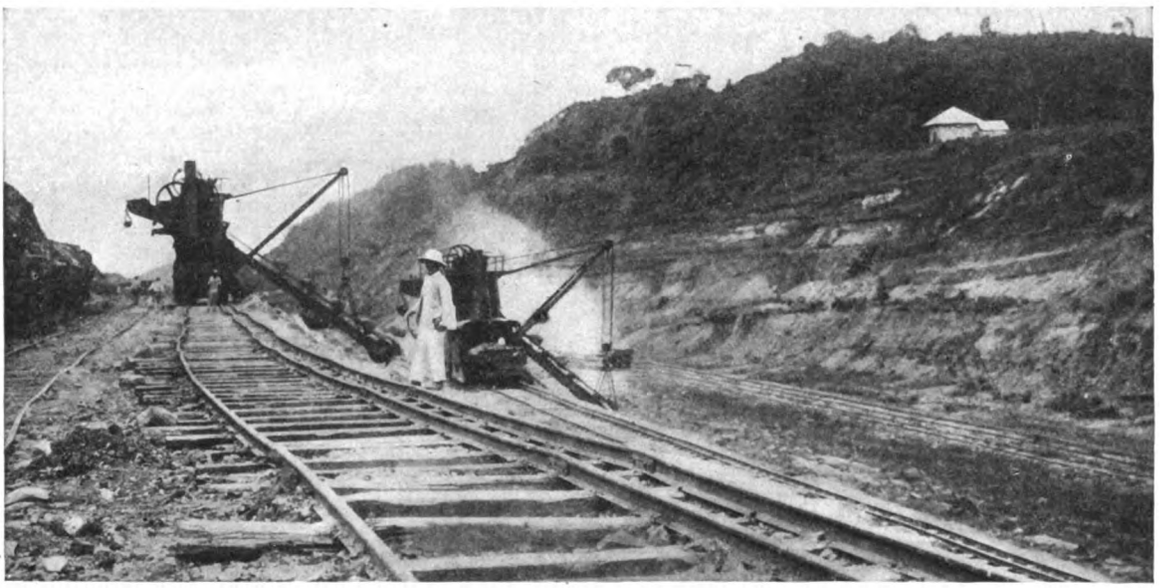
In heating wrought iron for case-hardening there are several considerations, the principle one being heat and the duration of time for carbonization. Heating: In point of importance it stands first, for if the primary cause of bad case-hardening could be traced, its origin in a majority of cases would be found in bad heating. We must, therefore, have a thorough admission of heat, uniform and exacting to a degree. It must be constant and uniform and should not exceed 1350°, as it has a bearing on the fibrous structure of the material.

Where I am employed we do a great deal of case-hardening. We case-harden as high as five tons of wrought material in 24 hours. This requires ten furnaces. We are exceedingly particular about the heat treatment, as much as we are in the heat treatment of tool steel when tempering. Some years ago I was employed where the general foreman had charge of case-hardening. Of course a general foreman has, and should have that right or privilege. However, this particular individual thought he was "It" in that particular branch—case-hardening was his "long suit." He arrived at his conclusion because of the great depth or case of hardness and the quickness with which he accomplished the result. He never took into account the preservation of the natural and proper structure of the material. Well, he got a very deep shell or case and very hard, but the articles were more akin to pig than wrought iron, due to an excessive high heat.

They case-hardened crank shafts in this manner: The crank pins were of the solid rod type with a projecting thread end. Their method of putting the crank in the driving wheels was by placing a sleeve over the threaded end of the pin, the sleeve butting against the shoulder or crank pin. A battering ram was then brought into service, striking the sleeve. Of course this method produced a great shock at the weak point of the pin, which was at the small or nut end. Oftimes the end in question would drop off while driving in the pin. Upon examination I found the structure of the material as friable and brash as cast rion. The amazing part of it was that the general foreman blamed the material. Of course the material was bad, but not until this particular genius put the finishing touch on it by his peculiar method of case-hardening.

The furnace is an important factor. An oil or gas furnace to work successfully should be so constructed as to secure the proper mixture of gases and a thorough and even combustion in every part of the furnace. The furnace should be constructed with roof arched throughout its entire length, in order that the heat may be reflected directly and uniformly upon the boxes. The passage to the chimney is formed underneath the hearth, causing a down draft, the action being to throw the heat down upon the boxes. There are six flues, separated from each other at the end farthest from the fire place. These flues run paralled toward the fire place or combustion chamber, where they are connected downward with the main flue under ground and thence into the chimney. It will be seen that this arrangement insures as near as possible an even heat throughout every square inch of the heating interior. The furnace thus described can be heated with either oil or gas and has a capacity of eight boxes, 12 inches wide, 20 inches long and eight inches high. The size of the box is of course governed by the size of the articles to be case-hardened.

A quick method for case-hardening consists in heating the material to be hardened to a red heat and submerging it in a bath of molten cyanide of potassium, leaving it in from one to five hours, according to the bulk of material to be hardened. Cyanide of potassium gives off poisonous fumes, consequently the vessel containing it should be placed in a furnace with a draft. This method is dangerous for the operators and extreme care should be exercised when used.



EXCAVATORS MOUNTED ON RAILS AND OPERATING IN THE CANAL. THESE MACHINES AND THE STEAM SHOVELS ARE DOING THINGS AT PANAMA

The Manipulation of High Speed Steels.

GEO. LINDSLEY.

Annealing is accomplished by the steel being heated to a good full red and holding the heat as near stationary as possible for two or three hours, then allowing the piece to cool as slowly as possible, say 12 to 18 hours, according

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to size of box. The most successful annealing is done by packing the material to be annealed in powdered wood charcoal, or anything that will hold the heat and exclude the air. If only small articles are to be annealed, then a piece of pipe large enough to allow a good layer of wood charcoal will be very good, and where a furnace is not available, it can be done in a forge, well baked and left over night, then laid down to cool slowly before breaking the seal of fire clay. Some claim best results by heating the steel before putting it into the box, but my impression is that, if the box is large, the article is not being held at the proper heat long enough to get best results. Some claim bone, and others say charred leather, is best as a packing; others claim good wood charcoal is preferable, giving as their reason that it enriches the surface of the steel in carbon. Of course we all know that these are all very high carbon, and doubtless the steel may take in carbon; but, let us reason: The surface is going to be machined as deeply as the carbon has penetrated, and again, the carbon is most susceptible to heat, when you heat to harden. The flux arising on the point of a tool, is the carbon being cast out, and we want it out. Then arises the question—has the charcoal, leather, bone, lime, or any other material anything to do with annealing? One smith tells me he doesn't use anything but simple heat in an oil furnace. He then closes the door, excludes the air as much as possible and has good results. Hence, my conclusion is that the best method of annealing high-speed, or any other steel, is to hold the heat not too long, and to exclude the air from it. The slower it cools the softer the steel; and wood charcoal, holding the heat better, perhaps, than any other of the before-mentioned materials, is most

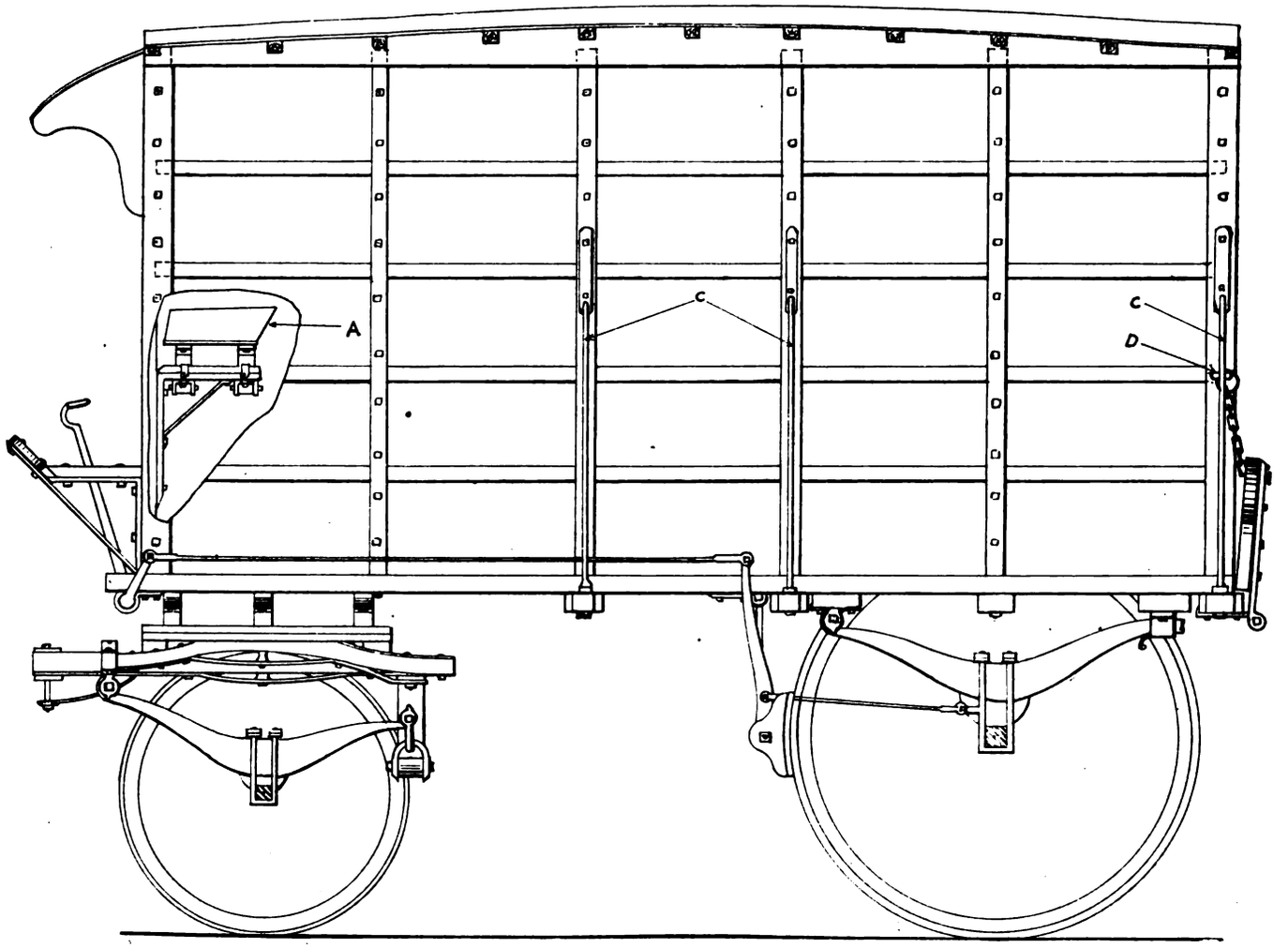


FIG. 1—A SIDE VIEW OF THE TRANSFER VAN SHOWING ITS GENERAL LINES AND GIVING AN IDEA OF THE FINISHED VEHICLE

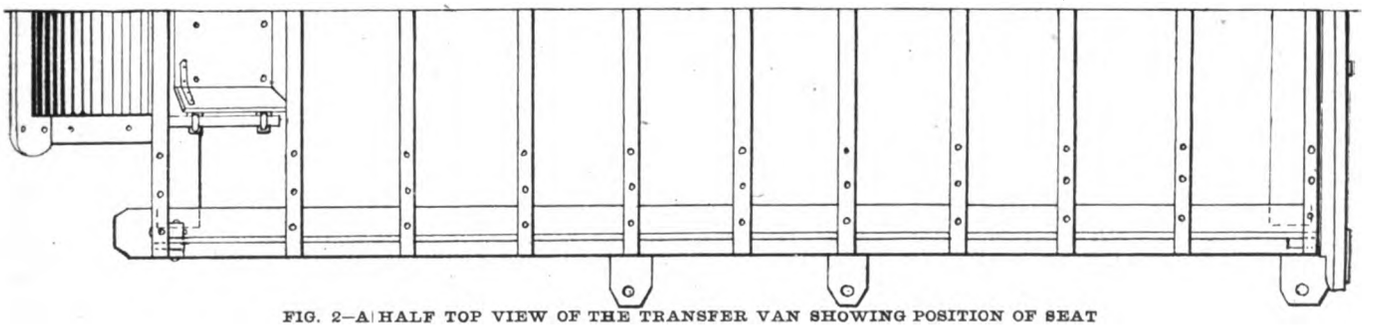


FIG. 2—A HALF TOP VIEW OF THE TRANSFER VAN SHOWING POSITION OF SEAT

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generally used—but not because it is richer in carbon.

I was called on to make a forging of high speed steel on short notice, and the idea occurred to me that if exclusion of air was most essential, I would try it with lead. Having a 12-inch piece of 4-inch wrought pipe handy, I welded one end solid, thus forming a pot, which I filled ⅔ full of lead. I got the lead and pot to a good high heat, placed the hot steel into it, and let it cool down together. After it had cooled below the melting point of lead, some 630 degrees, I reheated it sufficiently to remove the steel, and then let it cool slowly. This I cut as ordinary carbon steel in the lathe. I do not claim this as the best method, but it is a good way to get out of a pinch.

We now come to the hardening and tempering. This is more mystifying to our men than any other part of steel manipulation—first, because for years and years we were all taught the cherry-red theory; nothing over a cherry-red, and of course our ideas were, and are yet, confused by the difierent colors of cherries, some being almost white. But this is no longer a standard. In hardening this peculiar metal, we must first forge it and lay it down to cool. Some will say, "Why do this; you have to heat it again?" Yes, but not so far back—only the cutting edge is to be hardened.

Great care is necessary in heating, notwithstanding that some say you cannot get it too hot. This is a mistake. You can, by too rapid heating, fuse the edges of the tools, so they become brittle and crumble. Time should be given the steel to absorb the heat. I am aware that the first instructions sent out with this steel were to heat the point as quickly as possible; but this was not to allow the heat to go back of the point. The steel makers have overcome this. They were only in an experimental stage themselves then. Heating too fast also brings another danger to the steel, more so in a finished tool, by the force of the blast getting through the coke and oxydizing the edges. When the flux begins to show itself, first, by minute bubbles, then a number of small bubbles that will unite and run slightly, it should continue for a minute or more before removing from the fire. The scale is carefully removed and the air applied, preferably cooling from the back part of the tool. By so doing you can better direct the distance. This applies to lathe tools, but for taps, milling cutters, reamers, and kindred tools, where long heats are necessary, a furnace is almost indispensable. True, hollow fires do good work, if built well, but the heating is not so high. The sweating heat is still needed, and fish or linseed oil should be used as a bath to cool them.

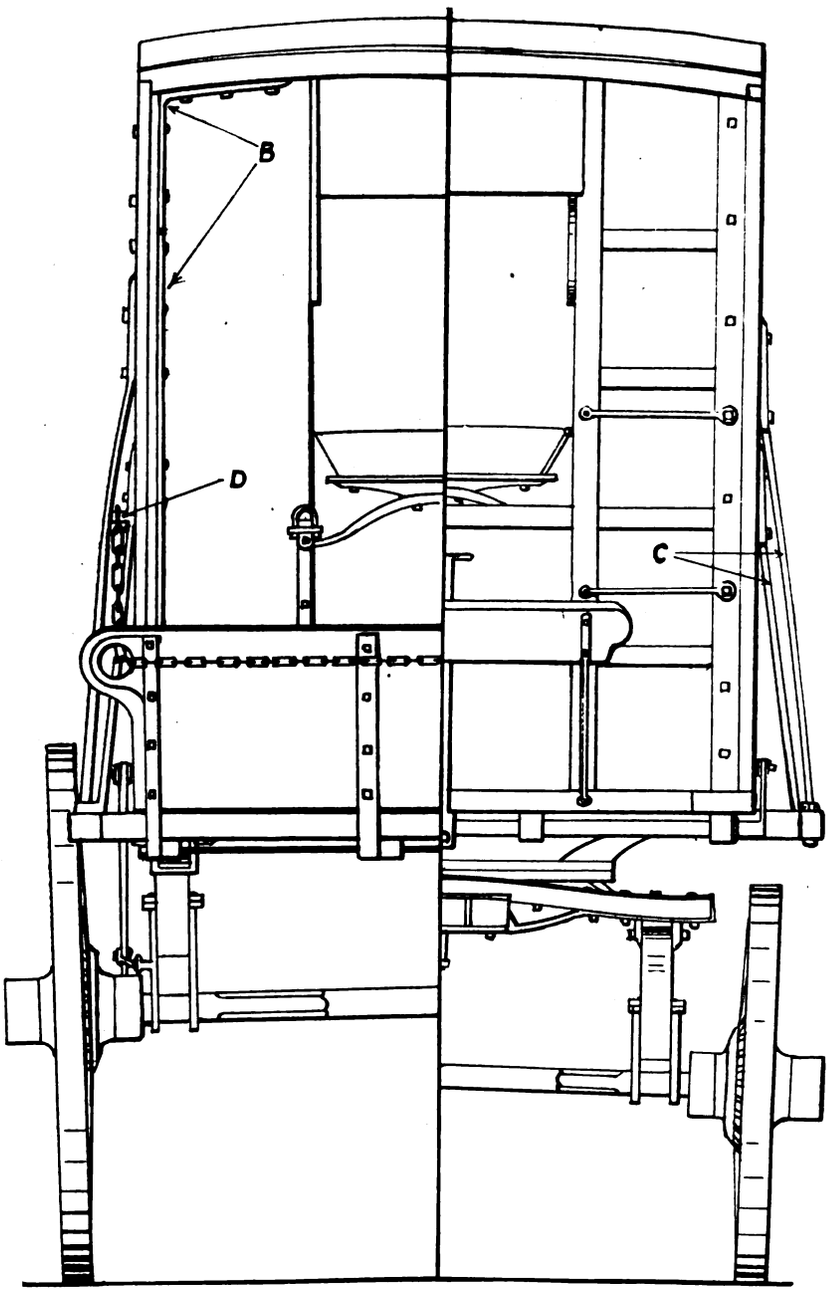


FIG. 4—SHOWING THE HALF REAR VIEW OF TRANSFER VAN

FIG. 3—SHOWING HALF FRONT VIEW OF TRANSFER VAN

Working Plans for Building a Heavy Transfer Van.

NELS PETERSON.

This van is especially built for heavy transfer work, the moving of household goods and work of like character. The engraving at Fig. 1 gives a good general idea of the vehicle, while Figs. 3 and 4 show a half front and a half rear view. A top view, or plan of the body, is also shown in Fig. 2, the boards forming the top covering having been left off, to give a better view of the cross pieces that support the roof of the body, and to show the position of the seat. This is hung on two springs supported by a couple of angle irons, fastened inside the front panel as shown in Fig. 1. A portion of the side panel has been removed for the purpose of showing the seat at A. The dimensions of the the body, outside measurements, are 12 feet long by 5 feet wide by 6 feet high at the corners, curving upward to the center, where it measures 6 feet 3 inches from the bottom to top edge. The sills for the body are from 6 by 2½-inch stock. The side sills extend

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forward about 6 inches past the front cross-sill, for the purpose of forming a step for the driver when climbing to the seat. The corner pillars are 4 by 1 inch and the four pillars, ex-

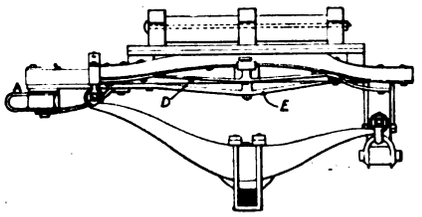


FIG. 5—SHOWING A SIDE VIEW OF THE FRONT TRUCK

tending vertically from the bottom sills to the top rail, are 2 by 1 inch. These are morticed into the sills, and halved where they cross the rails, running lengthwise of the side of the body, thus forming a smooth surface on the inside to which the side panels are fastened. Heavy strap bolts passing through the sills extend upward to within 12 inches of the top and are bolted to each of the pillars on the inside of the panel. The corners formed at the joint of the top crossbars and upright pillars, are also reinforced by heavy corner irons, as shown at B Fig. 4. And for the purpose of further bracing the sides of the body, three of the heavy 4 by 2½-inch cross-bars are made to project 6 inches out from the side of the body and support a double brace made of ⅞-inch round iron. These run up to a height of 2 feet 6 inches as shown at C in Figs. 1, 3 and 4. The end-gate is one solid piece of oak 17 inches high by 1½ inches thick, extending out past the body sufficiently to permit of boring a hole large enough to pass a chain through with grab hook on one end. The chain, which serves as an end gate fastener, is welded into a lug in the short body brace as shown at D Figs. 1 and 4. It is then passed through the holes in the end gate and run through a ring welded into the lug of the short

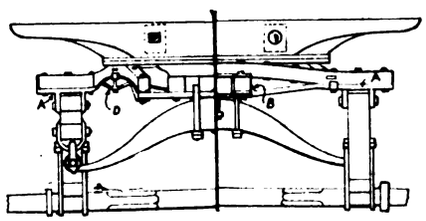


FIG. 7—SHOWS HALF REAR VIEW OF FRONT TRUCK

FIG. 6—SHOWS HALF FRONT VIEW OF REAR TRUCK

body brace on the opposite side, the grab hook serving for adjusting the end gate to the desired position.

The details of the front truck for the purpose of showing to better advantage the various parts that go to make up the truck are shown in Figs. 5 to 11. The side-springs are 3 inches by 40 inches long with 17 plates. The cross-spring has 18 plates 3 inches wide and 42 inches long, center to center. The axle for the front gear is 2¼ inches square with a 11-inch spindle. In building this class of vehicle but little attention is given to the width of the track as the length of the cross-spring determines the distance between the side-springs. The length of the axle between the collars must then be calculated from the distance between the side-springs, allowing sufficient room outside the spring to prevent the hub of the wheel from wearing against the axle clips. The rear axle is considerably heavier than the front one, being 3 inches on the square. Owing to the width of the body it becomes necessary to have the track much wider for the rear truck than for the front one. In ironing the trucks the amount of

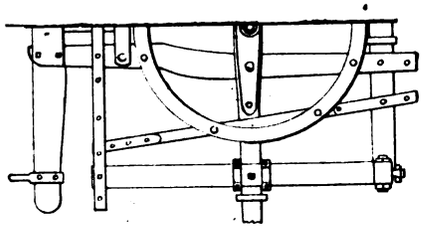


FIG. 8—SHOWING HALF TOP VIEW OF FRONT TRUCK

load they have to carry should be taken into consideration when selecting the stock to be used for braces, etc., and it is always safest to have it a little heavy rather than not heavy enough. To begin with, we first make the splinter-bar brace. The part of this iron shown at A Figs. 5, 6, 7 and 9, which constitute the spring shackles, is drop-forged and can be bought for any sized spring. The center is then forged out of a piece of ⅞-inch round. In this case, a pair of lips are jumped on and fitted against the sides of the hounds, as shown at B, Fig. 6. A piece of iron 1½ inch by ½-inch is then welded to the spring-shackle at C, Fig. 9, and run back full length under the side hounds. Under this is fitted a truss made of ¾-inch round as shown at D, Figs. 5, 7 and 9. A heavy truss, ⅞-inch round, is also made to fit under the hounds as shown at E, Figs. 5 and 9. The circle is 2 by ⅝-inch and 33 inches in diameter. In putting on the circles they should be placed so that the bearing will be in the center on the transient plate, leaving the circles free to turn. The construction of the top gear is shown in Figs. 5, 6, 7 and 11, and can be made easily enough without further explanation. The other details of construction are clearly and well shown in the engravings. The top is covered in the usual way to suit the customer while the sides may be covered with

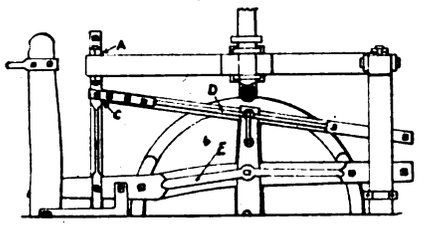


FIG. 9—SHOWING HALF BOTTOM VIEW OF FRONT TRUCK

oiled cloth or other material to carry the owner's advertising. The latter, however, is not absolutely necessary, as the side boards may be painted and decorated to suit any purpose.

The Key to Success as Told in the Smith Shop.

Be true, said the tire.
Keep moving, said the belting.
Keep things hot, said the forge.
Keep things going, said the engine.
Keep pounding, said the hammer.
Sand is needed, said the box of flux.
Keep a stiff upper lip, said the tongs.
Don't give too much, said the spring.
Don't slip any cogs said the tire bender.
Cut out the unnecessary, said the hack saw.
Keep continuously at it, said the band saw.
Have a tight grip on things, said the vise.
Don't lose your metal, said the bar of iron.
Keep your temper, said the piece of steel.
Have plenty of grit, said the emery wheel.
Bore into things and investigate, said the drill.
Have a cool head, said the engine cylinder.

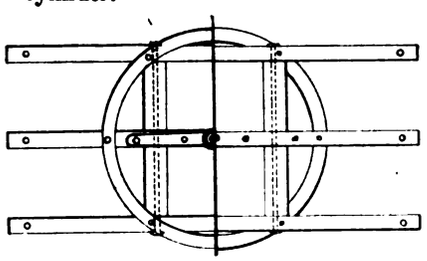
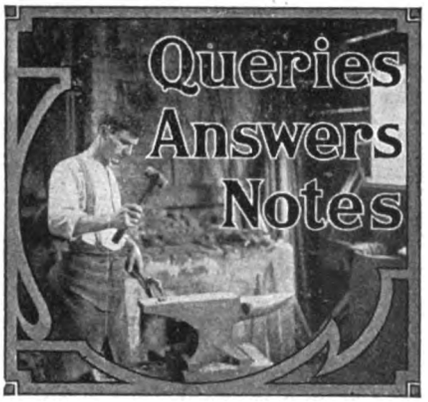


FIG. 10—SHOWS HALF BOTTOM VIEW OF BOTTOM GEAR

FIG. 11—SHOWS HALF TOP VIEW OF TOP GEAR

Keep a square face to your work, said the anvil.
Have things running smoothly, said the oil can.
Keep the flame of ambition burning, said the blower.

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The following columns are intended for the convenience of all readers for discussions upon blacksmithing, horseshoeing, carriage building and allied topics. Questions, answers and comments are solicited and are always acceptable. Names omitted and addresses supplied upon request.

A Three-Horse Evener.—Please tell me how to make a three-horse evener for pole, and neck yoke to hold back. C. T. CAMP.

To Build an Emery Stand.—Can some brother smith tell me how to make an emery stand? In answering, please give full description through THE AMERICAN BLACKSMITH. F. C. STRACKE.

What do you Charge for Thread Cutting?—What would be a reasonable charge for cutting threads on pipe from ½-inch to 2 inches? I hope some American Blacksmith reader can tell me. J. W. K.

How do you Handle Vicious Horses?—I want some one to tell me a good way to handle vicious horses so you can shoe them easily. I have a way of handling them, but I want a better method. A. A. VELZY.

Who Makes a Machine to Bore Pillars?—Can any reader of "Our Journal," or some advertiser who is also a reader, tell me where I can get a machine for boring 10-foot columns or pillars? I want it for acqueduct pipe boring. GEO. BRADLEY.

Wants a Boring Machine.—Will some reader of "Our Journal" kindly tell me how to make a tennon and boring machine for hand or power? Please give a description through THE AMERICAN BLACKSMITH. F. C. STRACKE.

How to Babbit Boxes.—I notice Jacob Verrips wants to know a good way to babbit boxes. I find the following a very good way: Heat the shaft and the boxes and get your metal as hot as you can, then pour it freely and it will not stall before it gets around. JOHN T. JONES.

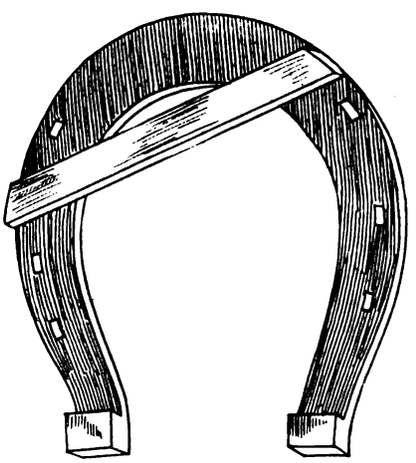
How To Weld Wide Tires.—I wish to tell Brother Derks, in the January number, how I weld a wide tire and not have the edges burn. I first scarf the ends to fit same as any tire and tilt my tire in the fire away from the chimney. Use plenty of sand and take a good heat and weld. Then reverse the tire in the fire and proceed as before and you will find it works pretty well. S. B. CONEWAY.

What can you say About a Power Hammer?—Has some smith any information to spare regarding a power-hammer? I want the best hammer for a small, one-man shop—one with about a 40 or 50-pound hammer. Which is best an upright or a helve hammer? Also which are best, steel or wooden helves? Are there any books published on the working or operating of a power hammer? I prefer to hear from eastern smiths, as we have no plow work in this part of the world. C. W. D.

About Shoeing Stocks.—With reference to Brother R. S. Benson's inquiry in the December number as to best horse stocks, beg to advise that I used one make of stocks in Scotland and another machine in Canada. Now I have the Barcus stocks in my shop. I have had bronchos in them that were never haltered, till they were haltered and shod in the stocks. And it was done with perfect ease and safety to both the smith and horse. Only be sure you have good ropes. Screw them in with the breast and hip ropes, after which I consider it a snap to shoe bronchos and mules. WM. GUTHRIE.

To Shoe a Toe-Wide Mare.—In answer to A. E. Price in Nov. number: I think if he shoes the mare in question with a shoe with small calks, and places the toe-calk from in front of the first nail hole inside, she will go O. K. I had a little experience with a horse that was given away on account of being toe-wide and was not shod properly. I pulled the shoes off and told the parties to let him run bare for a while. Then I saw he wore inside of the toe. I rolled the toe inside and he went better. Next, I was told to roll the toe out, but he went lame. I then pulled the shoes off, shod with ⅜-calks that went clear across the shoes, and from before first hole to back of first hole, and he went O. K. C. E. BECK.

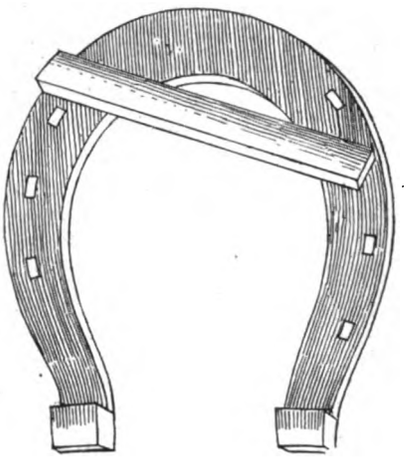
About Dressing Hammers.—In the December issue, Thornton tells "Jim" not to bother making a hammer but to buy one. That is all right, but unless I am greatly mistaken, "Jim" will want to dress up his



SHOEING A TOE-WIDE MARE

hammer some day, and Thornton might have told him how to do that, and to temper them. Vulcan gives a very good plan, in my way of thinking, of how to harden the hammer, but if he will take an old tea-pot or something with a small spout, and instead of dipping the hammer, will pour water in the center of the face and harden this way, he will not have the face drop off some day, cracked just where the surface of the dip came. GEO. BRADLEY.

Do Shoeless Horses get Corns?—I would like to ask some of your readers to talk on this question: Does a horse get corns when he hasn't any shoes on? I have had an argument on the subject with men who claim to have had the experience on the ranges of Wyoming. They claim the cob-



SHOEING A TOE-WIDE MARE

ble stones cause corns. I claim that what they refer to are bruises and not corns. I would like to hear from some of the other experienced craftsmen, through THE AMERICAN BLACKSMITH, on the subject. I will say, also a little about the benefits I find in reading THE AMERICAN BLACKSMITH. I think it is the most beneficial piece of literature a tradesmen can get hold of and, although I have only been a subscriber since September, 1906, I am sure that I am one of the most interested readers it has, and I expect to continue. TOB COTTON.

In answer to Several Questions.—If Jacob Verrips will heat the box and shaft, he is going to babbit, he will have no trouble with the metal stalling.

In answer to B. H. Jones, regarding the horse interfering, will say: Dress the foot level, then if he hits with the heel, make a shoe with inside heel the heavier, then trim the foot a little so that when nailed on the foot, the shoe will set perfectly level. This is, as many know, just opposite to the principle set forth in this paper, by many, but it works just the same, try it and be convinced.

As to the question of the shoes wearing out, will say: If after the shoes are fitted, he will take a piece of cast iron (old stove plate will do) and melt it on the toes and heels, and while dripping hot, plunge into water, it will make the shoes last much longer. J. R. WELSCH.

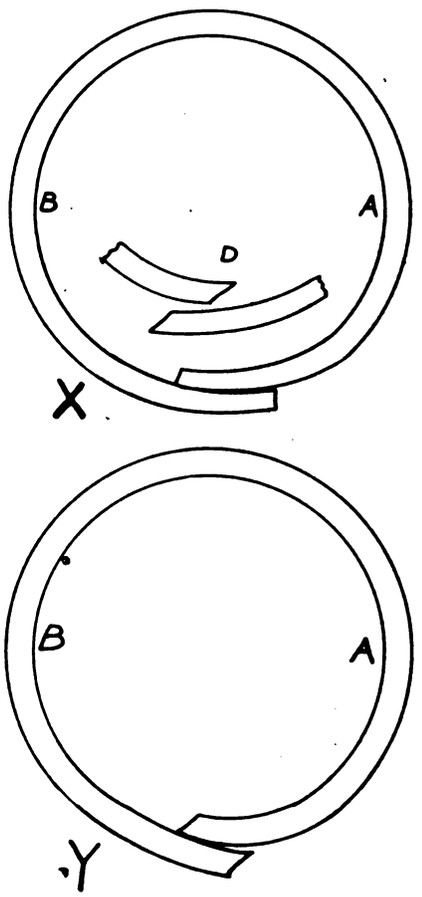
A Power Shop of York State.—I started to learn my trade when I was seventeen years old. I worked for my brother one year and a half. He then wanted me to buy a half interest in the business and I did so. We worked together about eleven years. Then his health failed and I bought him out. The first year we worked together we did about eight hundred dollars worth of business. In the year 1906 I ran the shop alone, or rather, hired a man and did $2254.88. Last spring I put in a three horse-power Fairbanks-Morse gasoline engine. I have a drill, a rip saw, a cut-off saw, a band saw, a grind stone, a turning lathe, a tire upset, tire bolting machine,

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two fires with blowers, and a tire bender. My horseshoeing shop is 36 by 40 feet. My wood-work shop is 40 by 50 feet, and two stories high. I do all kinds of repair work, from sharpening scissors to building a new wagon. I have one man and we have all the work we can do now. A. A. VELZY.

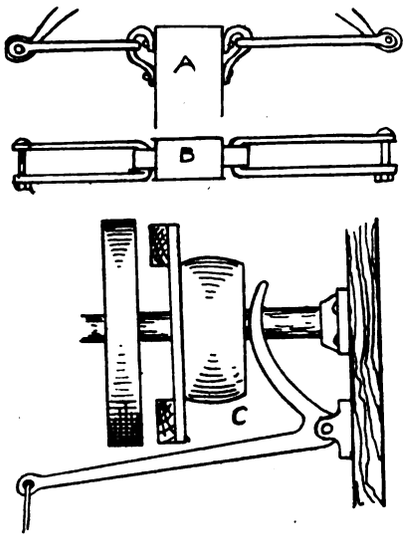
Tempering Mill Picks.—Z. J. Monette wants information on tempering mill picks. Try this, brother: Mill picks should be hard as possible and moderately tough, and the greatest care should be taken to avoid burning the steel. Where there is much of this work to be done, the picks can be heated in a pot of cherry-red hot lead and then dipped plumb into clear water of about 60 degrees Fahrenheit. Do not draw the temper. The hardening by the ordinary smith's fire can be well done if charcoal is used, and the pick not hurried through the fire, for hurry burns the corners, Much also depends on the shape of the pick. as to whether it is a sectional or leaf pick, or a thick, solid pick, the last being the most difficult to manage, on account of the thick back and sharp edge. A pick of this kind is laid across the fire, as to heat the eyes as fast as the edge. W. S. HATHAWAY.

How To Weld Wide Tires.—After the tire is bent and ready to scarf and weld, proceed as follows: Place the tire, after marking, into your fire as at X, the side A



HOW TO WELD WIDE TIRES

towards yourself. Then heat and cut it across at a bevel as at D. Then with a piece of iron, spring the top piece under the bottom as at Y and pin with center punch. Now take a good heat with the B side towards yourself, and have your second helper assist to lift and weld. In following this way the bottom piece is hotter than the top when it is cut at D, but when reversed at Y the coldest piece is on the bottom. This gives you a chance to get an even heat



DETAILS OF POWER HAMMER

clear through, providing you have plenty of good coal that is well charred before welding. WM. H. OBLAD.

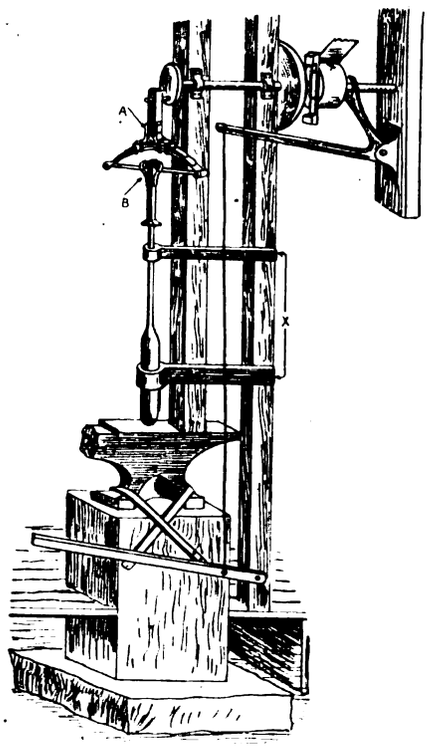
Cutting Key Ways.—In reply to H. L. L., in the January number, would say, if you have a planer, drill a hole at each end of where you want the key way, clamp the shaft in the planer and plane the key way. If you haven't a planer, but have a milling machine, drill the holes as before and mill out the key way. If neither planer nor mill are at hand, but a lathe is to be had, drill holes as previously described, make a milling tool to be used in the lathe, and cut the key way by sliding the shaft across the lathe under the milling tool while the lathe is running. If you haven't any of the foregoing but have a drill press, drill holes at short intervals along the entire way to be keyed and cut out with a chisel and finish with a file. If you haven't anything but a cold chisel, a hammer and a file, mark the key way and chip out with a narrow cold chisel. Then finish with a file. This is a very slow and tedious method, but with care you may be able to make a fairly good key way. J. R. W. LINKOUS.

A Number of Questions on Vehicle Work.—I would like to ask a few questions: First, what is a good packing to put in at the point of a boxen in a buggy or wagon wheel where the wood has worn away? The box projects from ½ inch to 1¼ inches. Some say to use melted sulphur, but it is not successful sometimes. Second, which is the easiest to handle, a high-wheeled 3½-farm wagon or a low-wheeled one? Which pulls the easiest? Which has the biggest strain? Which is easiest on the horses? These wagons are used for hauling lime from the kilns at the side of the mountains over some pretty hard, rocky roads to the city. They are loaded from 60 to 80 hundred. Third, what is good to put into axle grease and use on a skein where there has been some cutting and burning on account of lack of greasing? Some say a handful of salt and sugar will brighten it up. How about it? Fourth, is there a spring bench that can be used for fitting leaves in Ludlow springs where they are bent sideways as well as down? WM. H. OBLAD.

Particulars of Power-Hammer.—I noticed the trip-hammer by J. S. Hoffman in "Our January Journal," and wish to build one like it, but do not quite understand some of the connections. How is the hammer arranged so that he can stop pounding when the engine is still running? Also how is the connection made just below the spring to the piece that is welded to the hammer shaft? Also, are the pieces fixed solidly to the spring ends, or are they hinged? Are the pieces hinged or solid at B? F. C. S.

In Answer.—The hammer is arranged with a kind of clutch. The pulley runs loose upon the shaft when the hammer is not in use. When desiring to use it, the foot lever is depressed. This pulls the arm at the top end of the rod down, pulls the lever along the shaft and the lever in turn pushes the loose pulley against the fly wheel. The fly wheel being fixed solidly on the shaft, necessarily puts the hammer in operation. The connection between the spring and the hammer shaft is made by means of two clevises. This makes a hinged joint at both the spring ends and at the top of the hammer shaft. In the engravings, A shows a top view of this arrangement while a side view is shown at B. The arrangement of the shaft, pulley and clutch is shown at C. HAMMER.

An Ohio Shop And Some Prices.—My shop is 22 by 32 feet. I have a Hay-Budden anvil, a Stoddard tire shrinker, a



SHOP-MADE HAMMER BUILT BY BROTHER HOFFMAN

drill press, a 75-pound vise, a complete set of Green River stocks and dies full mounted, three sets of the old fashioned dies and lots of other smaller tools. I came here four years ago with little or no money, but now I have 37¼ acres of land and have it almost paid for. I carry for a side line tobacco, coal hods, boats, canvas, paint, shot gun shells and a lot of other small articles. I

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have about fiifteen hundred pounds of shoes and from three to five hundred pounds of nails, Capewell and frost nails. I buy my nails in lots of 250 and 300 pounds, and save money by it. Some of my prices are as follows:

Shoes, set of four	$1.00
Resetting	.40
Toe and side weight	1.00
Buggy poles	1.20
Wagon poles	1.25
Setting tires all kinds, each	.40
New tires, buggy	4.00

My other prices are proportionately the same as these. W. R. GORDON.

To Cure Quarter Crack.—Take the foot and file a groove 3/16 of an inch below the coronet and across the crack with the fine edge of a new rasp until you draw blood. Then take a pocket knife with a small blade, run blade through a cork until the point is trough the cork ¼ inch. Now cut the coronet on both sides of the crack three times and then cut once across the crack. Now put on a bar shoe, take the bearing off of the quarter of foot and put it on the frog. Now cover the crack with tar or any healing salve, and in three weeks, owner and blacksmith can watch and see the hoof grow. The shoe should be removed once every four weeks. I have used this method of treatment for 25 years, and it does not hurt a horse nor does it keep him from his every day work. W. H. MORROW.

A Talk on a Popular Topic.—I have been a subscriber for nearly five years and find much valuable information in it. I have worked at the trade for 30 years, but learn something new every day. In the first place, I would like to speak of the amateur horseshoer, the man who knows it all, who has never made a study of the anatomy and construction of the horse's foot. Now, in the first place, would it not be justice to the craft, if every horseshoer should stand an examination before he is permitted to perform this part of the work I believe many horses are ruined by improper shoeing. Before a man is permitted to shoe a horse he should be able to explain the construction of the foot. Here in North Carolina the "scrub workman" sets the price and many of the farmers do their own shoeing. At present we have no protection. I wish to see the time when every blacksmith must go before the State Board, stand an examination and take out his certificate. If he cannot stand the examination, let him learn the trade. We need protection, the same as the physician. We who have qualified ourselves feel very much cramped that the inferior workman should set the price. We want better prices and a better grade of work. S. A. SWAIM.

A Letter from Western Canada.—I have not seen any letters in THE AMERICAN BLACKSMITH from Saskchewan, so I will write one. I am on a homestead at present. I had a shop in Manitoba, but I thought I would come west and grow up with the country. I brought my tools with me and built a shop, but work is scarce yet. I intend building some harrows this winter, so I wish some brother smith would give me some plan through THE AMERICAN BLACKSMITH. I have been working on the railroad, but wages are low. There are so many botches out here that a blacksmith has a hard time to make ends meet. Any brother smith who is thinking of coming out here had better stay where he is if he is making a living. It is all credit, and coal is from 90 to 100% higher than elsewhere and everything else in proportion. I came from



TO CURE A QUARTER CRACK

the states about two years ago. I learned my trade there. I always make my plowpoints as Mr. J. M. Drew does, in the January number, of 1906. But I make them from ⅜ by 1¼-inch sleigh shoe steel and when a shoe is worn off badly on the point, I weld a piece of ⅝-inch square iron on the point before I weld on steel. and I never fail to make a good job. E. H. WRIGHT.

Can you weld iron tires?—Would like for some members of the craft to tell me how to successfully weld wagon tires. I am young at the trade, have lots to learn, and have had more or less trouble welding iron tires. Some time ago, I got a set of wheels to cut down and put on wide felloes and tires. The tires were 3½ by ½ inch and I never missed a heat. I did a good, neat job and in a short time. Then I had a set of 3 by ½-inch and had lots of trouble. Last week I tried another set of the same size and could not weld them at all. I got another smith to help me and we finally got them welded, but it was an awfully poor job. I tried a common lap weld, tried riveting them and took all kinds of heats, but every time, before I could get a heat, a kind of oil would run all over the heat and run in the laps. I tried borax and several compounds but they were useless. The old



THE CORONET IS CUT AND THE HEEL EASED

smith I had to help me said there was lots of cast in them. These tires can be successfully welded and I would like to have what information I can get on this subject. State about what weight of hammer to use. I generally use a three-pound hammer for nearly all but light work. Please give me the information as soon as possible, as I have lots of such work to do. W. S. GROVES.

A Note From Alabama.—I am a young smith 30 years old and came here from Sweden 10 years ago. I have been a blacksmith from my boyhood, as my father was a blacksmith. I have read THE AMERICAN BLACKSMITH for one year and have received many good hints from "Our Paper." My shop is 50 by 22 feet. I and a helper do all kinds of blacksmithing. horseshoeing, repairing and carriage painting. I sell buggies and wagons as a side line. Our prices are, you will see, very low.

Horseshoeing, 4 new shoes	$1.00
Setting buggy tires, per set	2.00
Setting wagon tires, per set	2.00
Buggy spokes, per pair	.10
Wagon axle	1.50
1 set of buggy axles	4.50
New set of buggy tires	4.00
Setting dray tires, 4 x ¾	4.00
New buggy shafts, per set	2.25
New wagon pole	2.00
New buggy pole	3.50
New rimming buggy wheels, per set	5.00
Painting buggies	6.00
Soldering bandsaws	.25
Tempering planer bits	.15

All other work in proportion. I have very good tools and enough. I have also a House cold tire setter, a set of Green River stocks and dies. I have no power in my shop and would be glad for some brother smith to tell me what make of gasoline engine is the best for a blacksmith shop, as I am thinking of buying one to set up in my shop. CARL LANGVILLE.

A Letter and a Question on Drop Sole.—I am only five years old as a blacksmith. Bought the shop I have now, hired an old blacksmith to work for me, and learned the trade under him. I take especial interest in the articles on horseshoeing. Two horses that I shoe have drop sole, or laminitis, and I do not understand this trouble thoroughly. I have been unable to get any specific instructions from the articles I have read, and would greatly appreciate it, if some brother, who has had good success in shoeing these kind of feet, would give me a simple A B C of the matter, so I might get it through my head. I use a plain shoe without a bar, with a blunt heel and no toe-calk. I also trim the hoof level and let the sole, unless it is too tender, come in contact with the ground, so as to take a part of the weight off the hoof.

While the mail order houses are scattering their catalogues over the country and people are buying lots of goods from them, no one is sending their horses to Sears, Roebuck to get them shod. The following are a few of the prices we get:

New shoes, per pair	40 to $ .75
Resetting old shoes, each	.20
Sharpening ploughs	.25
Pointing and sharpening plow	1.00
Sharpening shovels, per set	.50
Pointing shovels	2.00
Wagon or buggy tongue	2.50
Axles	2.50
Bolsters	$1.50 to 1.75
Spokes	15 to .20
Felloes	.20
Cutting down wagons	7.00
Welding tongue brace	.25
Setting tires, per set	2.00

Other prices are in about the same proportion. D. W. N.

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Best High-grade Steel.
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Made in all regular sizes, and in the new 18 inch Slim, which gives the user the advantage of a long stroke, and at the same time a rasp of medium weight.

ASK YOUR DEALER FOR THEM

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Prices Current — Blacksmith Supplies.

The following quotations are from dealers' stock, Buffalo, N. Y., Mar. 1, 1907, and are subject to change. No changes have taken place since last month's quotations.

All prices, except on the bolts, are per hundred pounds. On bars and flats prices are in bundle lots.

Bars—Common Iron and Soft Steel.

¼ in..	round or square;	Iron,	$2.95;	Steel,	$2.95
5/16 in.,	"	"	2.55	"	2.40
⅜ in.,	"	"	2.35	"	2.20

Flats—Bar and Band.

¼	x 1 in., Iron	$2.40;	Steel		$2.40
¼	x 1½ in., "	2.30;	"		2.30
5-16	x 1½ in., "	2.50;	"		2.50

Norway and Swedish Iron.

¼ in.,	round or square		$4.90
5/16 in.,	"	"	4.50
⅜ in.,	"	"	4.30
¼	x 1 in		4.80
¼	x 1½ in		4.20

PATENTS FRANKLIN H. HOUGH, Washington, D. C. No attorney's fee until patent is allowed. Write for Inventor's Guide.

PATENTS Write at once for most liberal offer ever made for obtaining patents and ask for Inventors' Guide, the best book published Est. 20 yrs. WM. H. MOORE, Wash. D. C.

PATENTS Herbert Jenner, patent attorney and mechanical expert, 608 F St., Washington, D. C., established 1883; I make an examination free of charge and report if a patent can be had; also the exact cost. Send for circular.

PATENTS PROTECT YOUR IDEAS

Send for Inventor's Primer. Consultation free. Established 1864.

MILO B. STEVENS & CO.,
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Branches at CHICAGO, CLEVELAND, DETROIT.

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We have a one coat Jet finishing Varnish, which has the color and the varnish combined in one coat which you cannot afford to be without in your business. Price 80c per gallon delivered at your R. R. station in 10 gallon cans. The best thing for finishing up old work as well as finishing up new.

HARDIN-HATTON CO., Ft. Wayne, Ind.

THE BARLOW HARDWARE COMPANY,
CORRY, PA.
Carry a complete line of Horseshoers' Supplies, Wagon and Carriage Material
Write for 1907 net price CATALOG just out. IT'S A MONEY-SAVER.

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CARRIAGE AND WAGON WOODSTOCK.
HORSESHOERS' SUPPLIES.
Send us a Sample Order.

WANTED AND FOR SALE.

Want and for sale advertisements, situations and help wanted, twenty-five cents a line. Send cash with order. No charge less than fifty cents

WANTED—Blacksmith good at repairs. Steady work. A. J. S., 1409 Dodge St., Omaha, Neb.

WANTED—Young man to learn the Blacksmith trade. Address M. C. ANDERSON, Berkhardt, Wis.

WANTED—Blacksmith for horseshoeing and repairing. Steady work.
GEO. G. BOWN & SONS, Fairport, N. Y.

AGENTS WANTED—For "Wabble Cure" buggy nuts. Big commission.
HARDWARE CO., PONTIAC, MICH.

HORSESHOEING TAUGHT—Students received and graduated by
PROF. GEO. E. RICH, Akron, Ohio.

WANTED—Ambitious men to act as agents for our fine line of calipers, etc. Address
E. G. SMITH CO., Columbia, Pa.

WANTED—Competent wagon maker to run shop for himself; must have good references.
JAMES WHITE, Princeton, Ill.

FOR RENT—Repairing and shoeing shop. Plenty of work. Small line of implements.
F. H. THOMPSON, Andrew, Iowa.

FOR SALE—One safety horse shoeing stock, complete and as good as new. Price, $25.00.
J. B. HOFFMAN, Fox Lake, Wis.

WANTED—Blacksmiths to handle Mineral Heave Remedy. No cure—no pay. Liberal terms to agents. Write for booklet, MINERAL HEAVE REMEDY CO., 418 Fourth Ave., Pittsburgh, Pa.

FOR SALE—Two good patents. One is for an oscillating cutter, the other a machine for welding plow shares to land sides.
A. M. ERICKSON, Carpio, N. D.

SITUATION WANTED—As traveling salesman for a good hardware house to visit the blacksmiths and wagonmakers, with a good line of supplies. WM. SMALLEY, Holmes, Duchess Co., N. Y.

FOR SALE.—Shop, lot and tools. Nowata, I.T, County Seat. Pop. 2500. Oil and Gas, 4 shops. Booming town. General repairs and shoeing. $600.00 cash. P. P. GREENE, Lenahah, I. T.

FOR SALE—Blacksmithing and painting shop in fine location in a country village: 2½ acres of land, seven room house, good barn, fine well of water and plenty of good fruit.
R. S. REEHER, Mercer, Pa., R. F. D. No. 6.

WANTED—Traveling men who visit the carriage, implement and livery trade make big commissions, selling our steel and rubber-tired wheels, as a side line. Why don't you try it?
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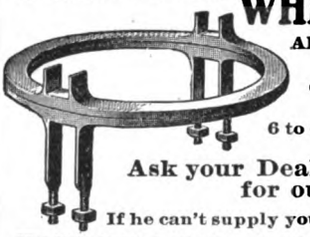
FOR SALE—Blacksmith, wagon shop and sled factory. Only shop in town. Three hardwood saw mills within three miles of town. Best farming country in the State of Minnesota. Will sell very cheap. Good chance for the right party. Address J. P. L., care American Blacksmith, Buffalo, N. Y.

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And the smith comes first of all professions or trades. The smith must make the tools first for all, from the surgeon to the safe blower, by using Toy's Treatise on new steels explaining how to work them with 75 new methods for working all difficult jobs. Ten receipts for making your own compounds for welding different kinds of steel solid. Thermite welding fully explained; also two colored tool tempering charts; chart A explains all annealing and hardening; chart B explains both scientific and plain tempering to a standard. All the above for $1.00. Valuable samples free.
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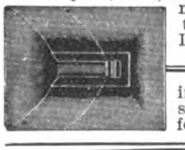


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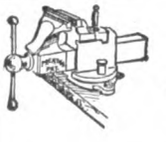
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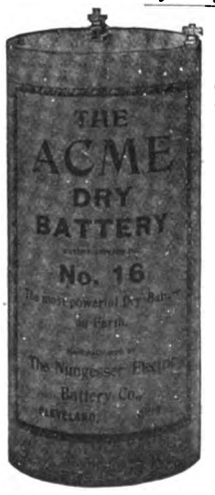
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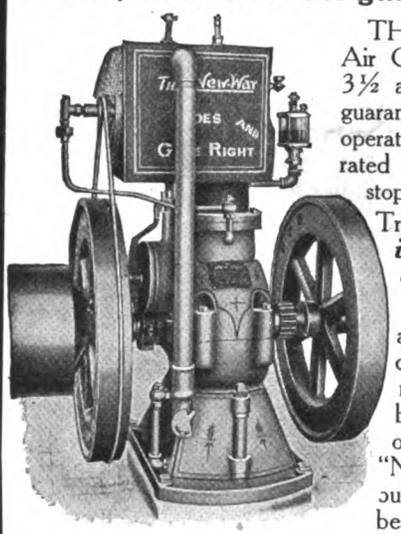
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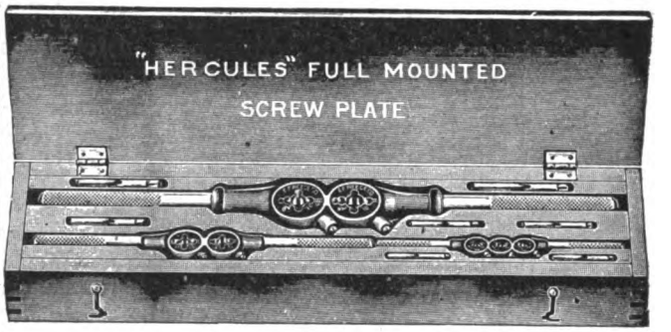
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You cannot find screw cutting tools, superior in quality and material, with keener cutting edges, lower in price or more satisfactory in any way than

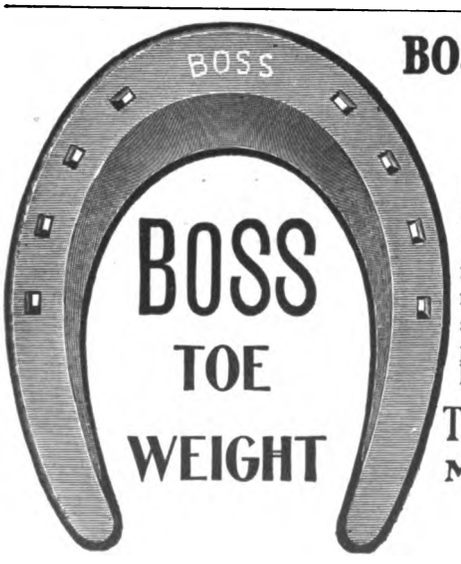
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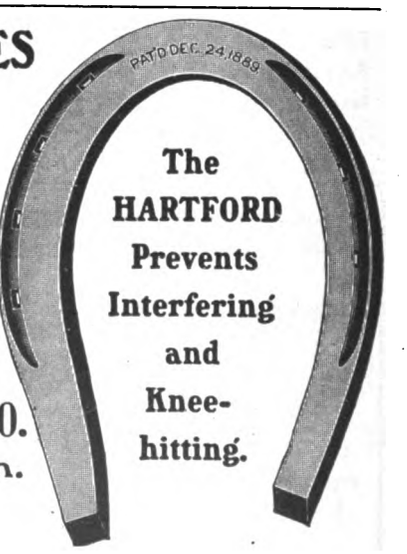


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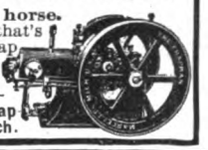
Send sketch or model for free examination and report as to patentability. Patents promptly secured. Advice and book free; terms low; highest references, and best service. Patents advertised free.

WATSON E. COLEMAN,
Registered Patent Attorney, WASHINGTON, D. C.

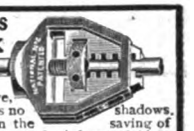
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R.S. & A. B. LACEY, Washington, D.C. Estab. 1869.

CHAPMAN ECONOMIZER

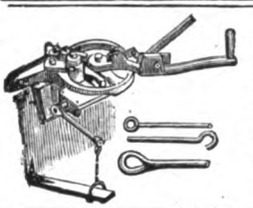
1 1-2 horse tested to 2 horse. He wanted a good one, that's why he didn't buy the cheap kind, but bought the simplest, strongest, and best designed, for the lowest possible price of H.L. Chapman, Box A, B. Marcellus, Mich.



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Made entirely of steel, especially for blacksmithing and carriage work. Positive, strong and self-cleaning. Casts no shadows. Will save cost over other chucks in the saving of time. Money refunded if not as represented. Ask your jobber for it or send direct for prices and circulars. The best is the cheapest. The Oneida National Chuck Co., Oneida, N.Y., U.S.A.



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We make **hand** power benders for forming eyes from stock 1⅜ inch thick and under. Any size eye 7 inches outside diameter and under.

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916 Garden City Block,
CHICAGO, ILL.

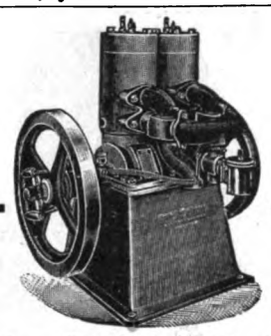
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the only practical lock neckyoke on the market. None better for safety and durability. Very handy for repair work. Have you tried them? Ask your jobber for them.

Descriptive circulars free.

THE ZIEGLER NECKYOKE CO., Coffeyville, Kas.



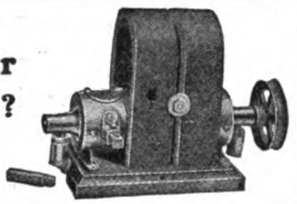
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Two cycle, a power impulse every revolution, we use no gears, cams, cam shafts, valves or valve springs, no engine can be simpler or more durable. If you want a well built engine, one built of the best materials, then just send us a postal for our catalogue and price list.

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"A Wizard Tubular" Does It.



Armature incased in WATER-PROOF non-corroding brass tube.
All brass screws. Friction, Belt or Governor drive.
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GOVERNOR DOES AWAY WITH BATTERIES AND SWITCHES.

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is just the power for the blacksmith. Many improvements. Simple, durable and reasonable in price. Write for new catalog if interested. Marine or stationary

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at small cost with the ERIE attachment. This includes every part of Up-to-Date Motorcycle except parts represented by the bicycle.
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Send stamp for Catalog—mention The Blacksmith.
Motorcycle Equipment. Co., Hammondsport, N Y.

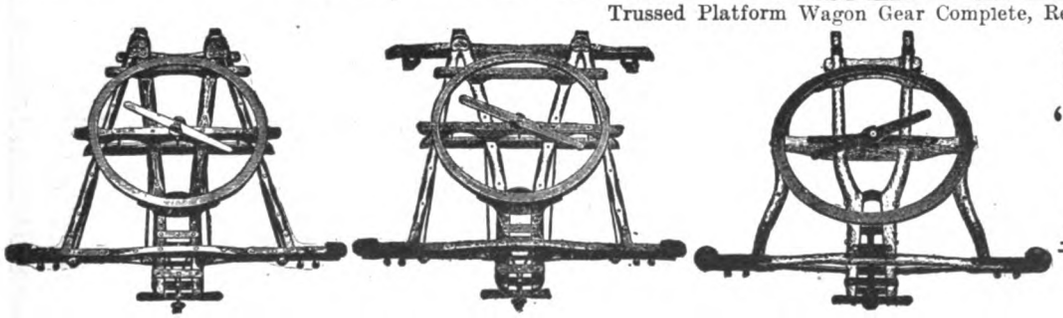
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As shown herewith, ready to receive body, for light and heavy work, can be furnished promptly.
In ordering, give full specifications, or such descriptions as will enable us to make up specifications.

Also Combination and Three-Spring Gears in several styles.



Trussed Platform Wagon Gear Complete, Ready for Body.



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THE AKRON-SELLE GEAR CO.

Akron, Ohio, U. S. A.

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BOSS LEATHER APRONS

Have you tried them? They outwear six of the ordinary kind. Send us your name and address and receive a miniature ***apron free.*** Our aprons are made of cow Hide, purely bark tanned, soft, pliable, strong and durable. You wlll appreciate their superior quality and extreme comfort.

ASK YOUR JOBBER FOR **THE BOSS LEATHER APRON**

If he cannot supply you, send your order direct to us. Upon receipt of price we will ship a perfect "Boss" Apron to you, charges prepaid, or will send by Express, C. O. D., giving you privilege of examining at the Express Office. If it does not suit you send back at our expense.

The "Boss" Aprons come complete either with or without bib. They have brass eyelets and leather straps, and every possible convenience.



PRICES:

"THE BOSS."		"THE BOSS" with bib.	
Size X, 30x36 in.,	$1.75		
" A, 26x33 in.,	1.50	Size D, 30x42 in.,	$2.00
" B, 24x30 in.,	1.25	" E, 28x38 in.,	1.75
" C, 24x27 in.,	1.00	" F, 26x34 in.,	1.50

Write us today and we will send you a miniature Apron, showing the material used and how they are made.

EDMUND C. BECKMAN,
SOLE MANUFACTURER
712 N. Fourth St., ST. LOUIS, Mo.



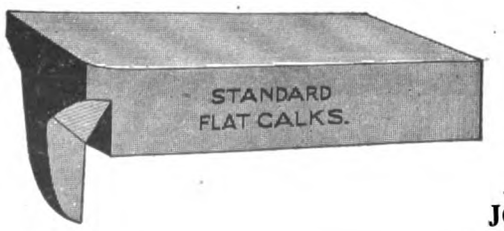
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(HOT FORGED)



STANDARD TOE CALKS are made from the best of Toe Calk steel by experienced men and both our Joliet and Cambridge factories are thoroughly up to date as to equipment.

These are the reasons **why STANDARD TOE CALKS GIVE SATISFACTION, why more STANDARD TOE CALKS are sold than all other makes combined and why the man who makes his Calks is becoming as rare as the man who makes his Horse Shoe Nails.**



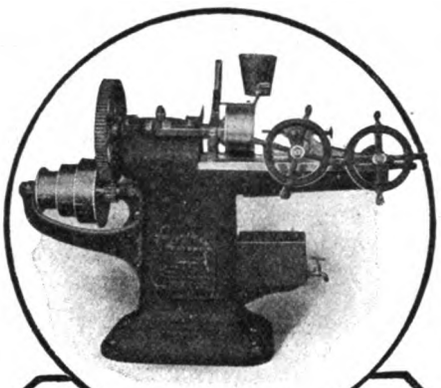


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JOLIET, ILL. CAMBRIDGE, MASS.

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FRONT VIEW

A Bolt Cutter is much like a man in this: THE HEAD is nearly everything.

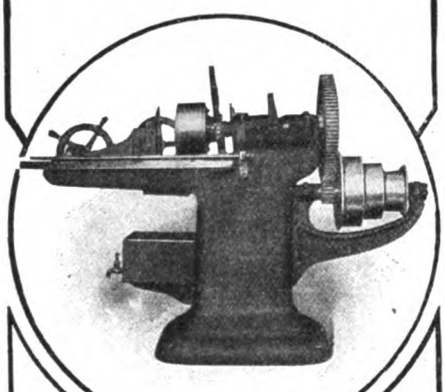
The Merriman Bolt Cutter Head is Noted for—

1. SIMPLICITY OF THE HEAD: Only Four Parts, consequently,
2. GREAT DURABILITY. Few repairs needed.
3. SQUARE BEARING OF THE DIES IN THE RING; consequently,
4. SOLIDITY OF THE DIES LIKE A SOLID DIE; consequently,
5. UNIFORMITY OF THE PRODUCT; Bolts all the same size,
6. EFFECTIVENESS OF OPERATION; Cheapest Help can understand and Run it,

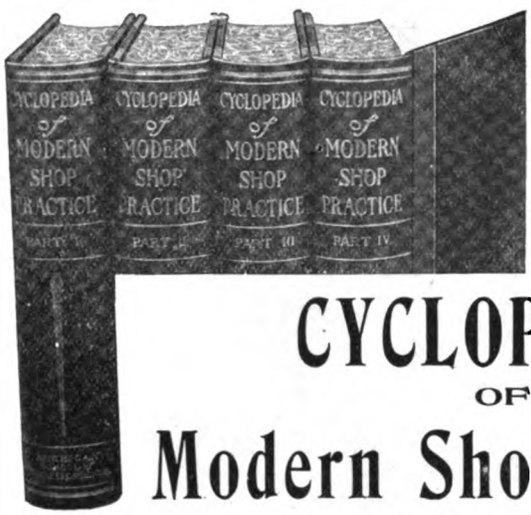
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REAR VIEW



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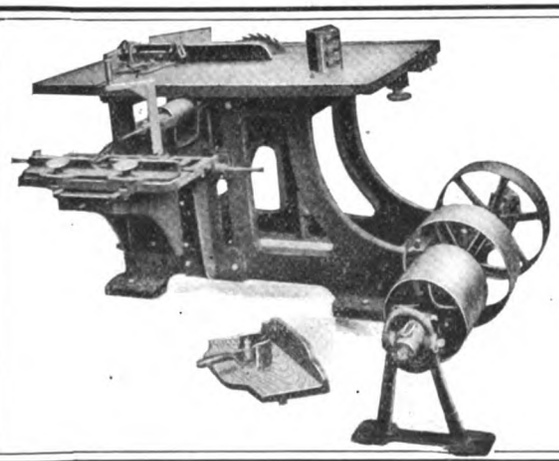
Machine Shop Work, The Lathe, The Planer, The Milling Machine, Tool Making, Thread Cutting Dies, Drill Jigs, Manufacture of Iron, Manufacture of Steel, Pattern Making, Machine Design, Metallurgy, Foundry Work, Loam Molding, Steel Castings, Brass Work, Shop Management, Gas and Oil Engines, Automobiles, Elevators, Construction of Boilers, The Steam Engine, The Steam Turbine, Management of Dynamo, Electric Machinery, Electric Wiring, Forging, Electric Welding, Sheet Metal Work, Tinsmithing, Mechanical Drawing, Wrought Iron, Fuel, Steel, The Forge, Tuyeres, Blast, Tools, Hammer, Anvil, Tongs, Chisels, Flatter, Swages, Punches, Etc., Forging and Finishing, Staples, Bolts, Hooks, Tongs, Wrenches, Etc., Tool Dressing, Welding and Tempering, Temperature, Scale, Flux, Scarfing, Butt and Lap Welding. Welding Steel to Wrought Iron. Annealing. Case Hardening, Brazing, Power Tools, Hammers, Punches, Shears, Drop Forges, Bolt Headers, Presses, Forging, Shafts, Connecting Rods, Cranks, Etc., Shop Suggestions, Shrinkage, Expansion.

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Install one of these modern tools and watch your profits grow.

Write for large circular and full particulars.

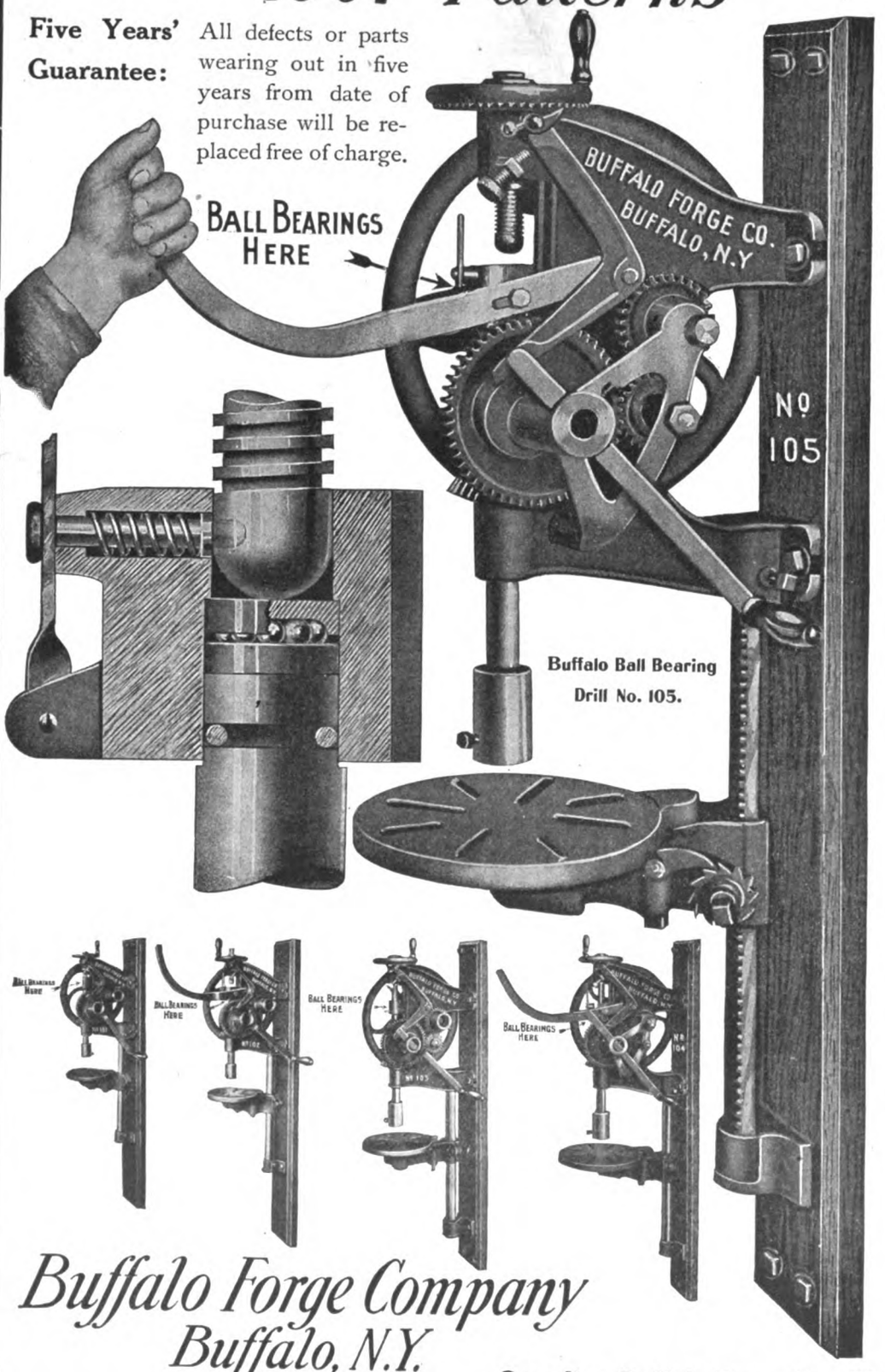
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1907 Patterns

Five Years' Guarantee: All defects or parts wearing out in five years from date of purchase will be replaced free of charge.



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BUFFALO 1907 DRILLS.

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Designs are
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Strong
Simple
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Pin Clutch; Nut Closing Devices avoided.
Combination Lock - Nut, Ball - Bearing & Pin Clutch.
Bearings ***bored*** and ***reamed*** in solid metal, no liners used.

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Buffalo, N.Y.

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COATES ELECTRIC CLIPPER

Clip your horse and sharpen his toe calks with the same machine. Move the light clipper around, no need to move the horse. You should know all about **Coates Flexible Shaft Machine.**

Send for Book A. B.

COATES CLIPPER MANF'G CO.,
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SEE PAGE 2

Do you want to increase your profits?

READ PAGE 2

Do you mind seeing a few extra dollars coming your way?

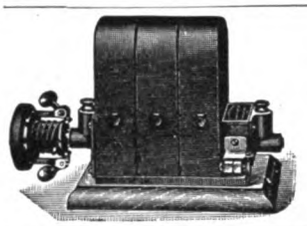
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HAND MADE WOOD HUB WHEELS

Built in our own Shop. Best of material and workmanship. Fully guaranteed. **Prompt shipments, prices right.** Send us a memorandum of the number of sets you want. Give size of hub, spoke and felloe, also height, and let us quote you interesting prices. If wanted tired, state thickness of tire. Ask for free catalog.

CRAY BROTHERS
Cleveland, Ohio.
Dept. A.
Manufacturers of Lumber Wagon Wheels, Carriage Tops, Seat Trimmings, Axle Gauges, etc.



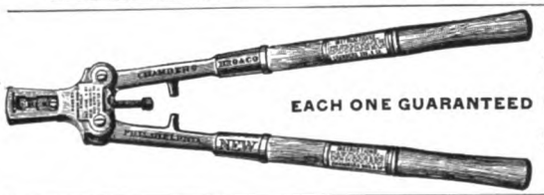
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Fires your gas or gasoline engine without the aid of batteries.

It is better and more durable than any Dynamo. Its Governor regulates the speed regardless of speed of Fly Wheel. Its Governor adjusts to imperfect Fly Wheels. Its Governor insures a constant and uniform spark. The spark does not burn the contacts of the engine. All strains are removed from the bearings of Magneto. FULLY GUARANTEED. AGENTS WANTED.

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EACH ONE GUARANTEED

BOLT CLIPPERS

CHAMBERS BROS. CO.,
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Philadelphia, Pa.

GOOD RULES TO GO BY



BLACKSMITHS' HOOK AND HANDLE RULES

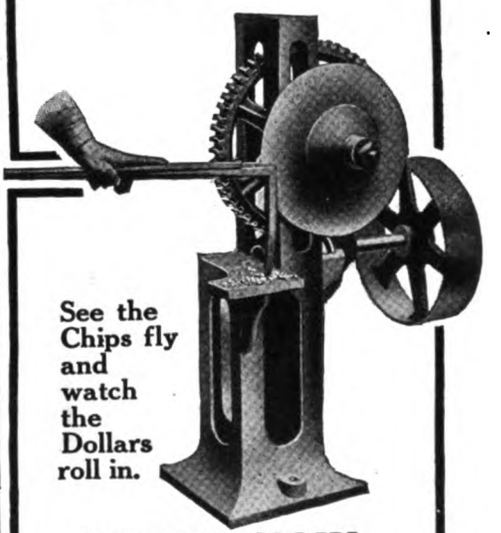
Made from hard rolled sheet brass, one-tenth inch thick, one and one-sixteenth inch wide, with heavy gradations and figures, graduated from the end in sixteenths of an inch on one side and from the inside of the hook in sixteenths of an inch on the other, adapting them for taking correct measurements from either the outside edge of a hot piece of iron, or from the inside when held against a corner. Graduated twelve inches, have flat handles and measure over all sixteen and three-fourths inches.

Price, postpaid, $1.15. **Catalog of fine Tools Free.**

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THAT BUYS THE
MONARCH DISC SHARPENER
GETS THE BUSINESS.

Don't let your Neighbor Do it First



See the Chips fly and watch the Dollars roll in.

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The Wonderful Work that this Machine does can hardly be believed—but seeing is believing. . . . . .

REMEMBER it was designed by a practical smith and is made by the oldest and largest Iron Works in the West.

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U. S. A.

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Cortland Welding Compound Co.

CORTLAND, N. Y.

Manufacturers of

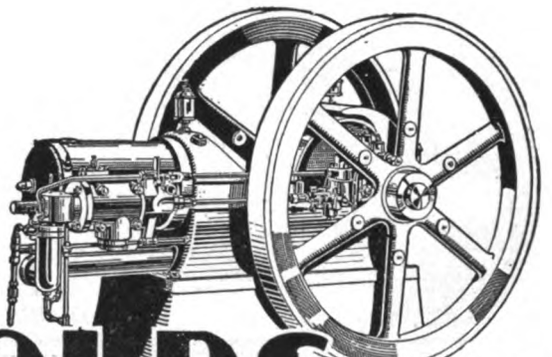
Climax Welding Compound,
Cherry Heat Welding Compound,
and BORAX--ETTE.

BORAX-ETTE FOR STEEL TRADE MARK
A PERFECT WELDING FLUX
PREPARED ESPECIALLY FOR WELDING
FAR SUPERIOR TO COMMON BORAX

BORAX-ETTE makes steel weld easily. It does not have to be applied between the laps like other compounds, but is used the same as borax. It has no equal for all kinds of steel welding.

SAMPLES FREE.

FOR SALE BY DEALERS IN ***BLACKSMITHS' SUPPLIES***



OLDS ENGINES

The gasoline engine best adapted to blacksmith work is the Olds Engine. It is simple—requires very little attention—will not get out of order.

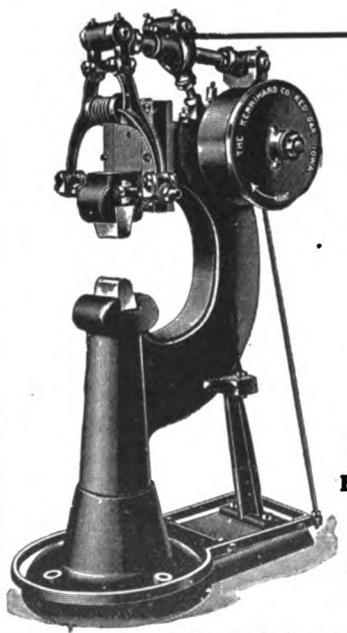
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It gives an economical power, without bother, and can be depended upon any time it is wanted.

Our catalog tells why this is so—please send for it and hear our story.

We make engines from 2 to 1200 h. p. The one you want at the price you want to pay.

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KERRIHARD'S POWER HAMMER

A first-class machine sold at a low price. Contains every modern feature. Strongly built of the best material. Will do your work easily and quickly and will do it right.

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BURRIDGE-COOPER CO., Ltd.,
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THE KERRIHARD GRINDER

Fitted with Sawing Table and Frame

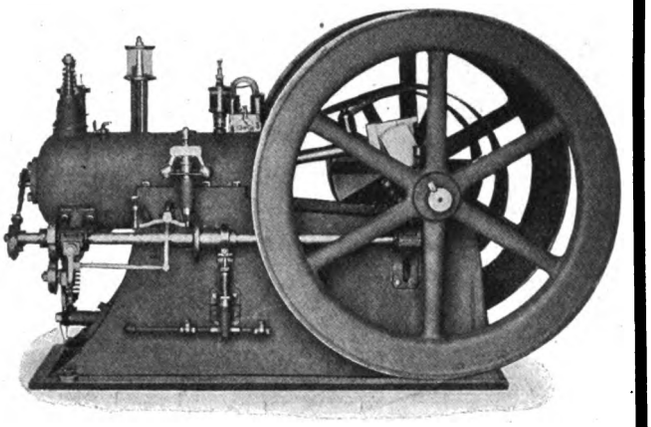
Has all the features of the more expensive and elaborate saw tables. Table and frame can be removed instantly and grinding wheel put on for grinding. Will take wheels to 20 in. diameter, and buzz saws 16 in. diameter.

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THE ANGOLA



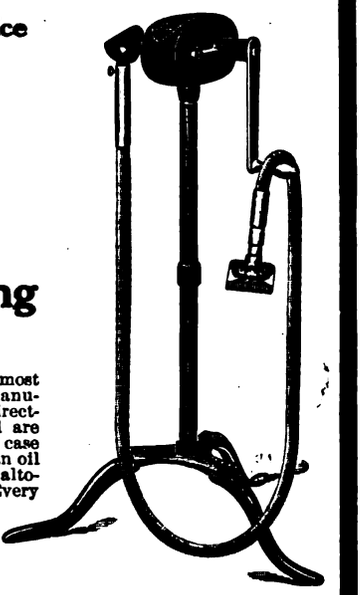
Investigate Its Merits.

Easy and simple to operate; few parts; close regulation of speed; thorough system of lubrication; economical; reliable; safe; durable and strong. Just the engine you are looking for to make your shop life easy. All sizes—1½, 2, 4, 6, 12 and 15 H. P. Stationary and Portable.

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THE ANGOLA ENGINE AND FOUNDRY CO.,
ANGOLA, INDIANA.

$6.75 Is the Price of This Genuine Stewart No. 1 Horse Clipping Machine



This is unquestionably the most perfect clipping machine ever manufactured. The gears are all cut directly from the solid steel bar, and are thoroughly enclosed in a metal case where they run constantly in an oil bath. It does away practically altogether with wear and friction. Every part of the driving mechanism is

GUARANTEED FOR 25 YEARS

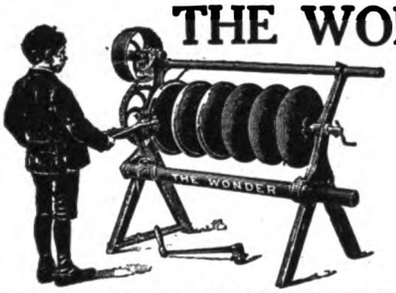
It has 6 feet of new style light easy running flexible shaft and is fitted with the highest grade Stewart one nut balance pressure clipping knife. It runs easiest of all clipping machines and clips very fast.

This is a truly marvelous machine. It will pay you to own it if you clip but two horses a year. Order one now. **SEND $2 AND WE WILL SHIP** C. O. D. for the balance.

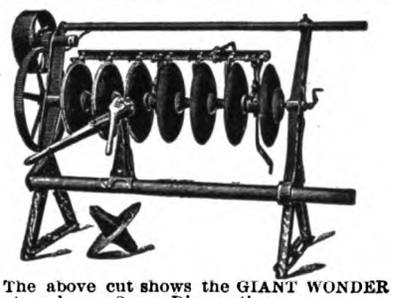
Our handsome new catalogue, free, shows everything modern in clipping and grooming machines—hand or power. Write a postal for it.

Chicago Flexible Shaft Co.,
126 La Salle Ave., CHICAGO.

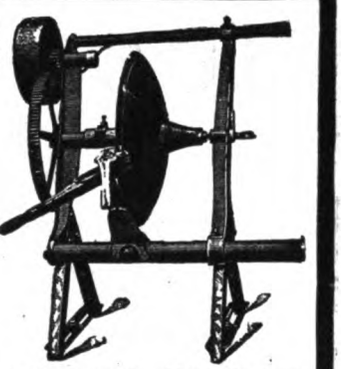
THE WONDER DISC SHARPENER



The above cut shows the LITTLE GIANT at work on a whole section of Discs. This machine is especially adapted for sharpening Disc Harrows.



The above cut shows the GIANT WONDER at work on a Seven Disc section.



The above cut shows the Giant Wonder at work on Disc Plows. Will sharpen any size from twelve to thirty-two inches in diamater.

January 1st, 1907, finds the Wonder Disc Sharpener at work in twenty-four States, Canada and Mexico.

The only Sharpener made adjustable to all conditions. Can shear any part of edge to any bevel. Can shear back from edge as far as necessary. Can use tool on either side of disc. Can shift from one disc to another. Can do all this without the turn of a set screw or nut, is a positive feed, automatically adjusts itself to wobbling or bent discs. Knives made of best grade of self tempering tool steel, will last a life time.

WISCONSIN—Dear Sir: I received your Wonder Disc Sharpener and have given it a thorough trial. Am more than pleased with it. I find that it not only sharpens, but makes the edge true and uniform like new. It is well-named, The Wonder.
Yours truly, I. G. STONE, Milton Junction.

KANSAS—A. E. Durner: This is to certify that I have been using the Giant Wonder Disc Sharpener for some time, and that I find it to be a Wonder sure. As I have used most all makes of sharpeners including the roller sharpeners, and I find to my own satisfaction that the Giant Wonder leads them all for quick and uniform work. I would not take four times the cost and be without the Wonder Disc Sharpener. Success to the Wonder.
Yours respectfully, E. B. NYE, Oketo.

IOWA—A. E. Durner: I bought one of your Wonder Disc Sharpeners last spring, and can truly say that it is the best machine I have ever used for sharpening discs. Yours truly.
JOHN T. CHANDLER, Low Moor.

SOUTH DAKOTA—A. E. Durner: I bought one of your Wonder Disc Sharpeners and found it O. K. and would advise any blacksmith in need of a Disc Sharpener by all means buy the Wonder as they will surely be satisfied.
Yours truly, J. W. IMPECOVEN, Kidder, S. Dak.

TEXAS—Dear Sir: I wish to say that the Wonder Disc Sharpener I bought this spring is O. K. It works well and is well worth the price. I am well pleased with it. Resp'y. A. F. BALL.

MISSOURI—Mr. Durner: I have one of your Wonder Disc Sharpeners. I think that it is what it is represented to be. I use my sharpener by hand power and it has proven, so far, to be the best I have ever used and am well pleased with it. Respectfully,
FRED WALKER, Duncansbridge.

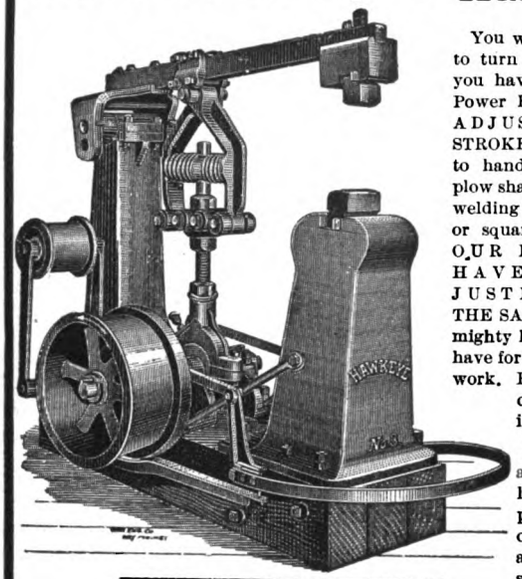
MISSISSIPPI—A. E. Durner: We wish to say that the Little Wonder Disc Sharpener we bought of Adams Neubert of Okolona, is all right and giving good satisfaction. We are well pleased with it. Respectfully,
TRICE & RADER, Okolona.

WRITE TODAY FOR CIRCULAR.

A. E. DURNER, Evansville, Wis.

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Hawkeye Power Hammers



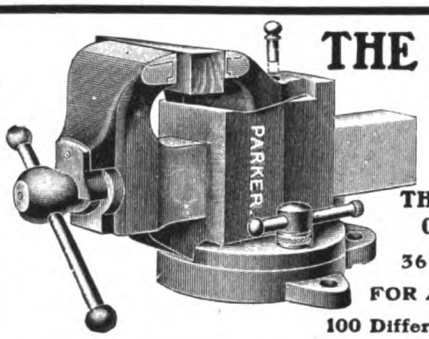
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CEDAR RAPIDS, IOWA

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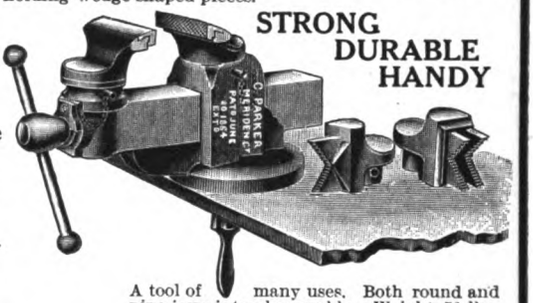
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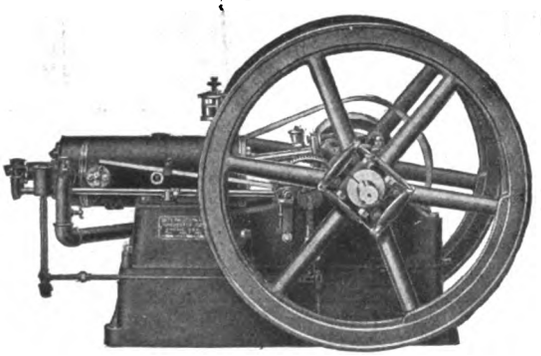
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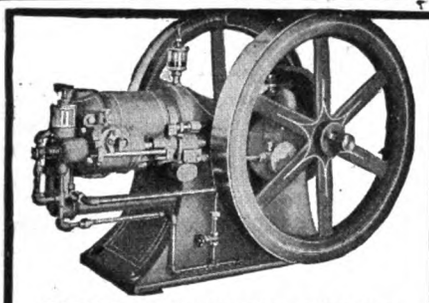
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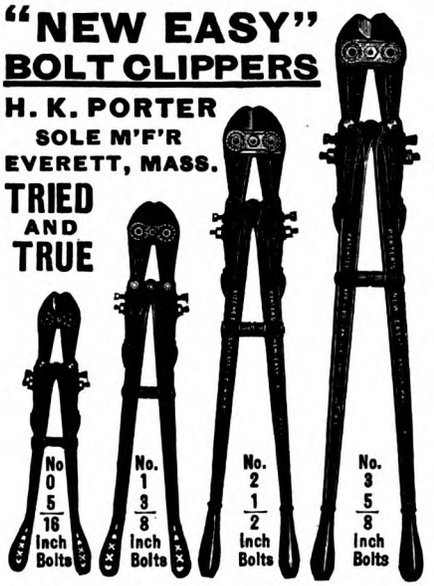
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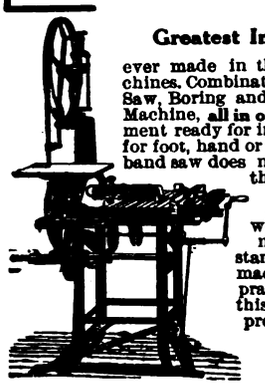
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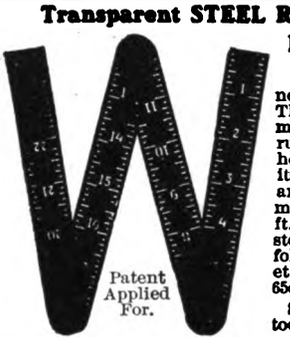


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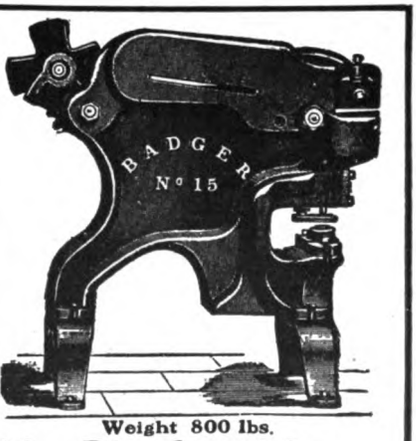
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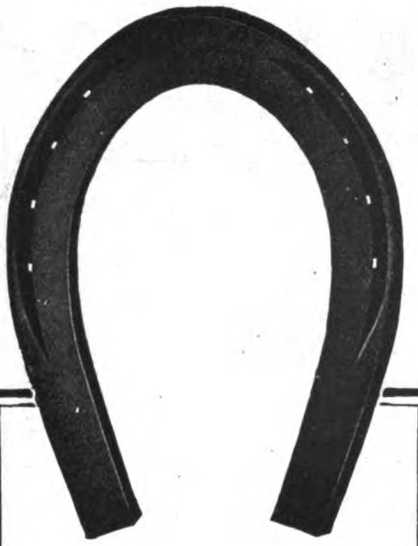
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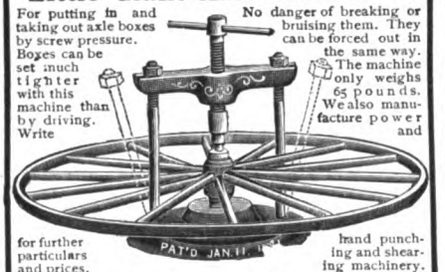
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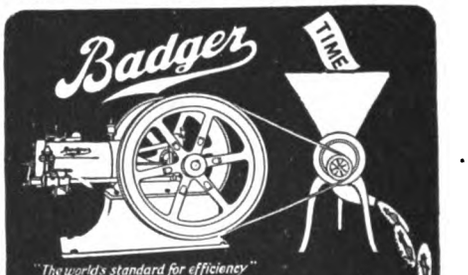
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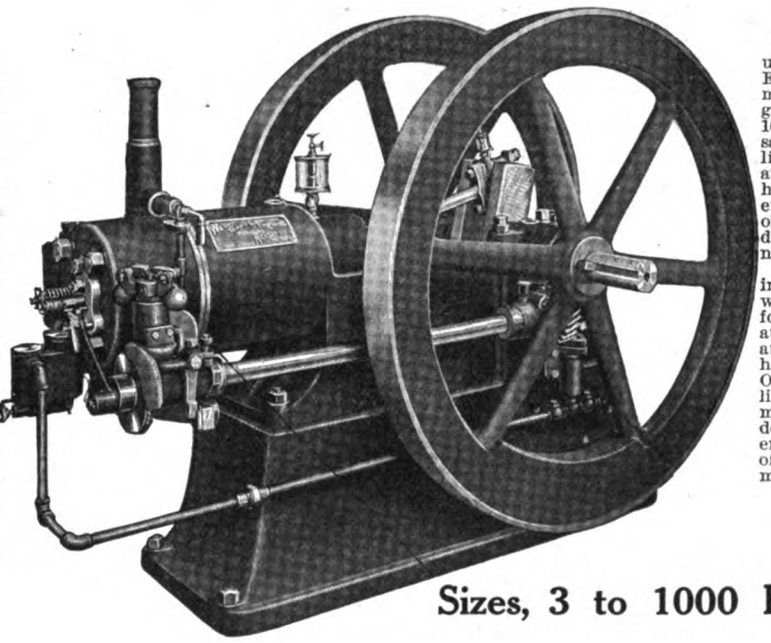
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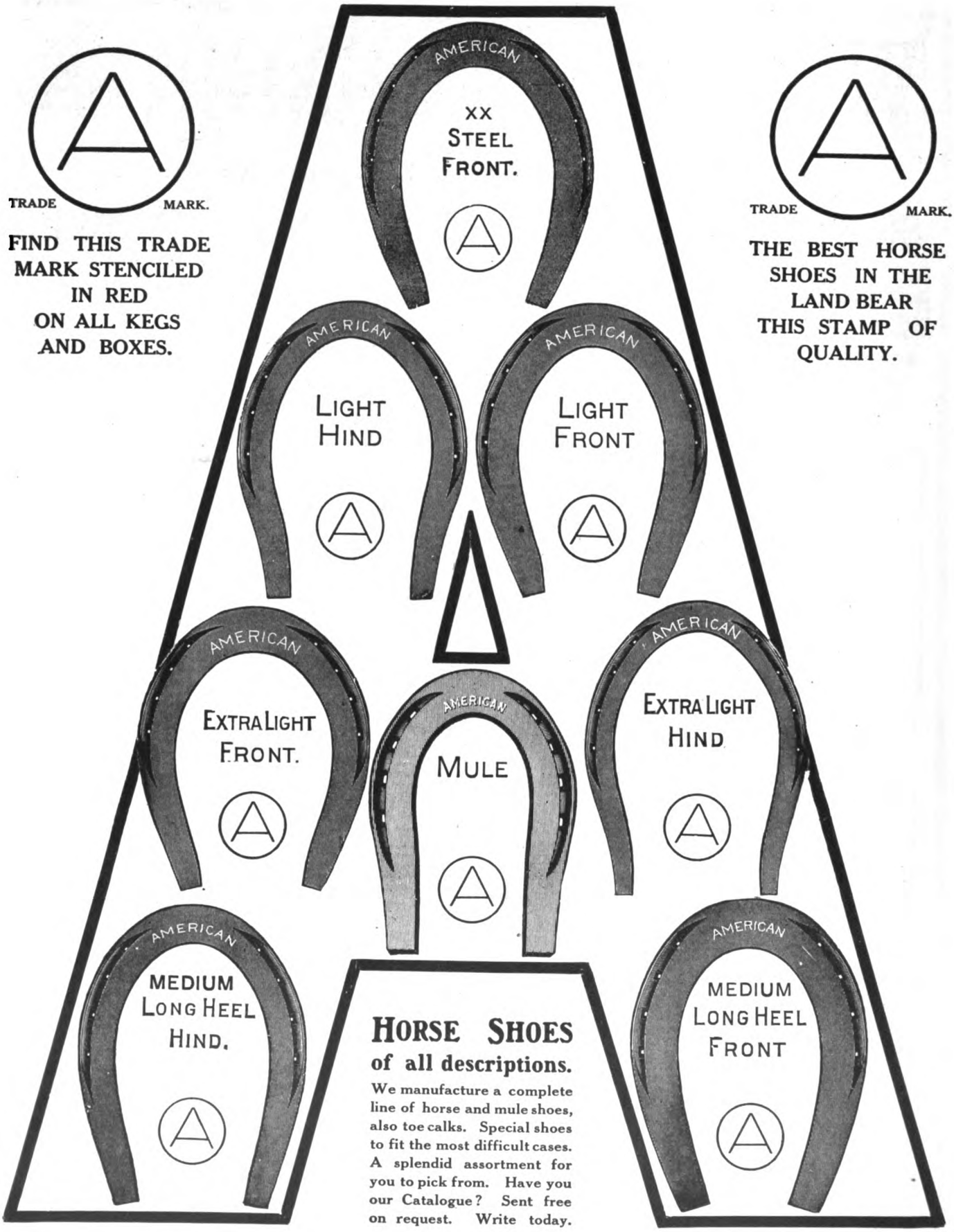
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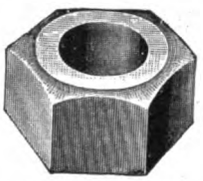


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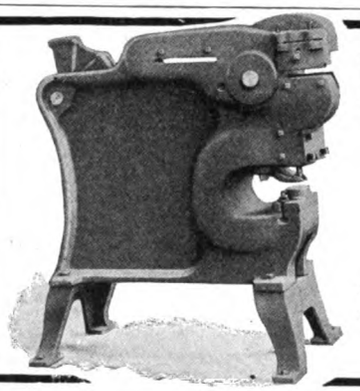
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Punches 5/8 in. hole through 5/8 in. iron.
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COMBINED
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The Most Powerful Lever Punch and Shear Made.

5 Punches and Dies with Each Machine.

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Only ONE operation of the Lever does the work. No changing required.

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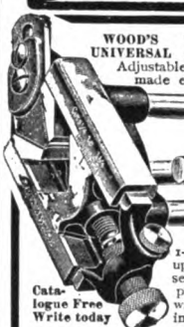
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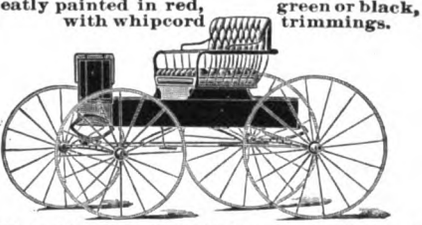


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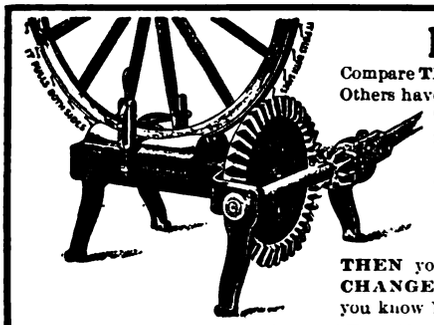


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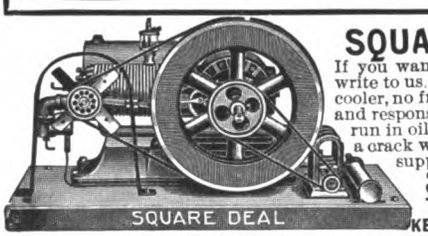




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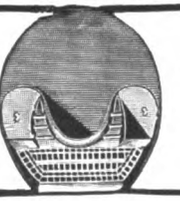
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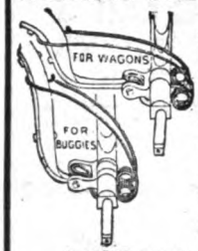
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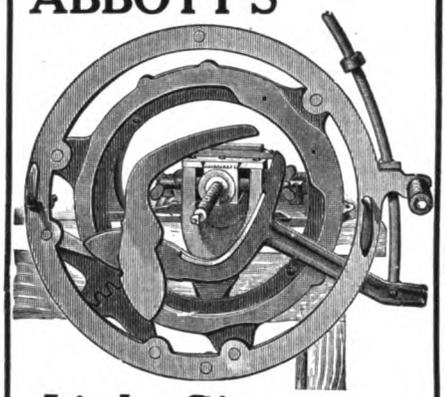
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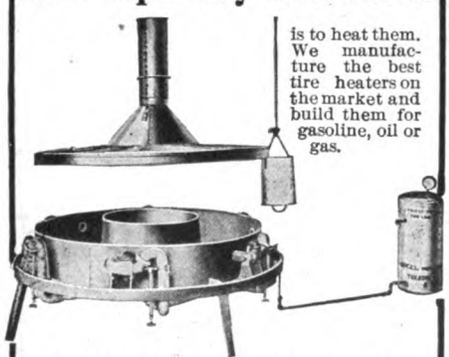
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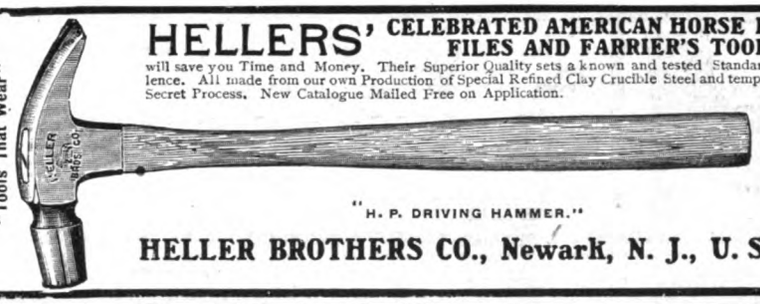


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"Superfine" implies comparison, but our "Superfine" Coach Colors, Varnishes and Japans are *above* all comparison.

FELTON, SIBLEY & CO.
Mfrs. of Colors, Paints, Varnishes
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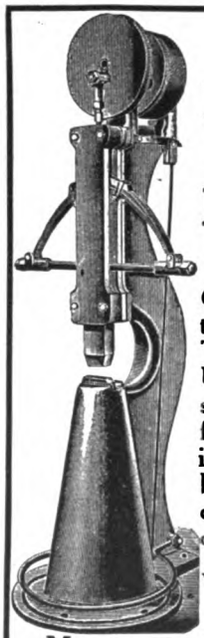
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Are winning their way on the strength of **real merit.** New design based on long experience. Rapid heater and will not crack as others do. Cast in one piece. Automatic vent alone is worth price of Tuyere. Steadily increasing sales is proof that Blacksmiths know a good thing when they see it.

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THE PERFECT POWER HAMMER

Made in 3 sizes.

Only one horse-power to run it. The best Trip Hammer in the U. S., by reason of its simple construction, efficiency and durability. Used exclusively by some of the largest carriage builders in the country.

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"PIKE CORUNDUM WHEELS

are the best for Foundry use and Tool grinding. Cool, free and fast cutting." Made of highest grade Corundum obtainable. Every user of a Pike Corundum Wheel is insured against accident by the Casualty Company of America. **Send for new illustrated Catalog.**

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Potters Spring Brake Blocks

For Vehicles of all kinds with STEEL OR RUBBER TIRE.
Have a record of excellency for seventeen years.

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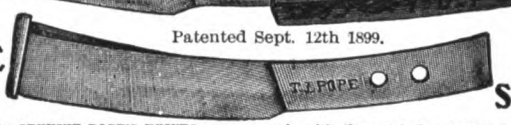
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Cushion Backs, Storm Fronts, Poles & Shafts. Write for 100-page Catalog.
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Buy the **GENUINE POPE'S**

Patented Sept. 12th 1899.



Do not **ACCEPT A SUBSTITUTE**

The handles of the GENUINE POPE'S KNIVES are now made with the notched end shown above. All such bear the maker's name, T. J. POPE. All genuine Blades are stamped PAT. SEPT. 12, 1899.

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"CHICAGO" EMERY WHEELS CUT QUICK

A wheel that will do the work in one-fourth to one-half less time is by far the cheapest in the long run. A wheel that will save only one hour per day during your busy season would pay for itself in full.

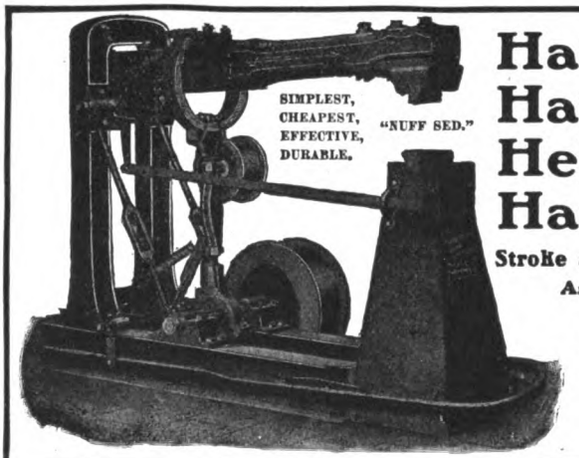


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have been on the market for over **TEN YEARS** and used by good Carriage Builders everywhere. Ask your dealer for them. If he can't supply you, **write for catalogue** showing all our different styles.

National Safety Fifth Wheel Co.,
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SIMPLEST, CHEAPEST, EFFECTIVE, DURABLE. "NUFF SED."

Hathorn's Hard-hitting Helve Hammer.

Stroke adjustable while running.

Ask your Dealer or write to

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"CHICAGO" WHEELS SAVE TIME

They're made of stuff that cuts

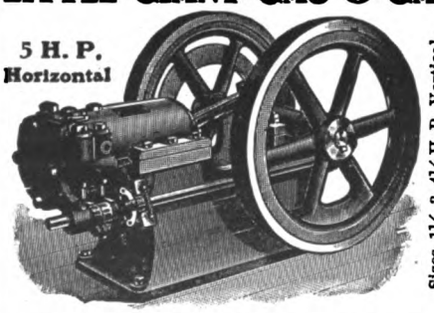
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5 H. P. Horizontal



Sizes, 1½, 3, 4½ H. P. Vertical. 5 to 25 H. P. Horizontal. **Either tube igniter or** electric igniter. Shipped mounted on skids, if desired for farm use.

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Also equipped with pumping attachments. **Write** for booklet describing full line New Era Gas Engines from 8 to 100 H. P. Special inducements to dealers as agents.

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TOPS FROM $4.40 UP.

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A Monthly Illustrated Technical Journal circulating amongst Coachbuilders, Wheelwrights and Blacksmiths throughout the Commonwealth of Australia, New Zealand and South Africa.

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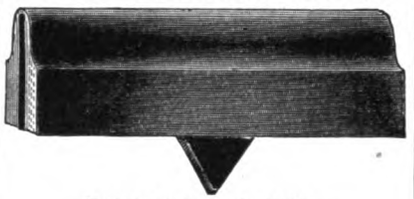
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HARD CENTER CALK.



Patented Aug. 8, 1906.

Will weld together and on any shoe with one heat. Center section will harden perfectly at cherry heat in slack tub. Write for information to

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COUNCIL BLUFFS, IOWA.

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TONGUE SUPPORT

Patent applied for.



FITS ANY FARM WAGON

ALL IN ONE PIECE.

NO EXTRA PARTS.

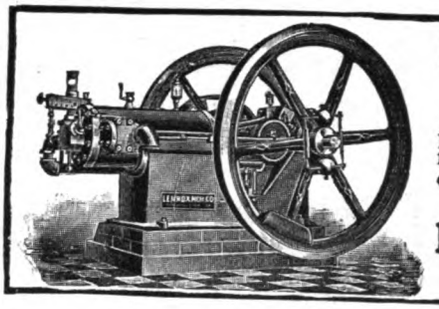
Attached by raising tongue and passing loose ends over queen bolt and back under the sand board. The KING is the only coil tongue support that can be attached without removing the queen bolt.

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WM. A. WALKER,

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RACINE, WISCONSIN.



Lennox Gasoline Engines

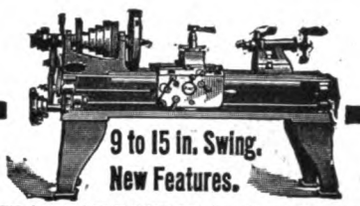
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Built especially for Blacksmith shop power. It means money in your pocket to find out about our engines before placing your order.

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Lennox Machine Company,

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9 to 15 in. Swing.

New Features.

SEBASTIAN LATHES are Good Lathes

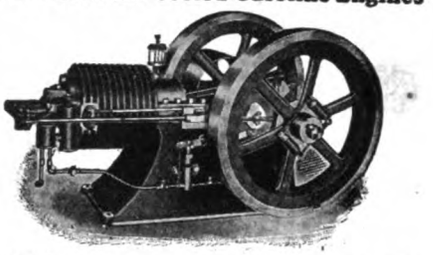
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Our engine lathes are provided with both screw and rod feeds as well as power cross feed. Gears to cut all standard threads from 5 to 36 are furnished. Steady and follower rests, large and small face plates and countershaft go with each Lathe. Foot Lathes, Tools and Supplies.

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Made in 2, 3 and 6 horse power sizes. What's the use of paying good money for an old style engine, when you can get something better in the "Gade Air Cooled" at the same cost. Buy one. It will not freeze up or go back on you in cold weather. It's ready for business all the time. We know it will please. By all means write for descriptive circulars and price list of the "Gade." Address, GADE MFG. CO., Iowa Falls, Iowa.

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Our Blacksmith's Special

3½ to 4 H. P.

GASOLINE ENGINE

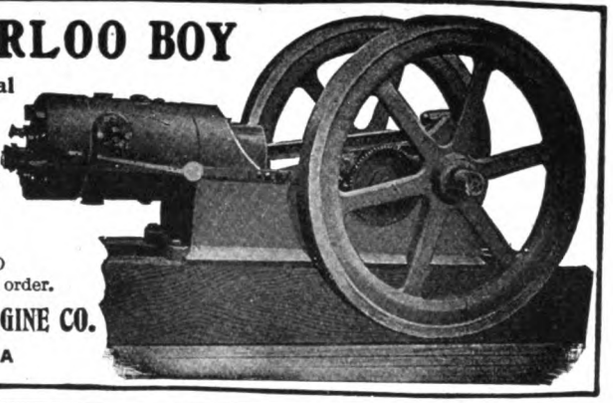
The Engine Is Right!

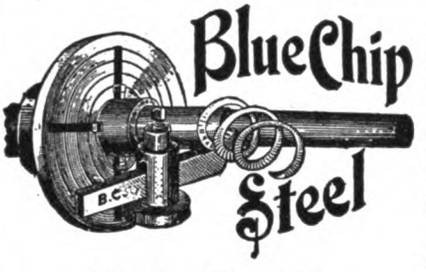
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WATERLOO GASOLINE ENGINE CO.

WATERLOO, IOWA





Will turn off blue chips on any kind of work.

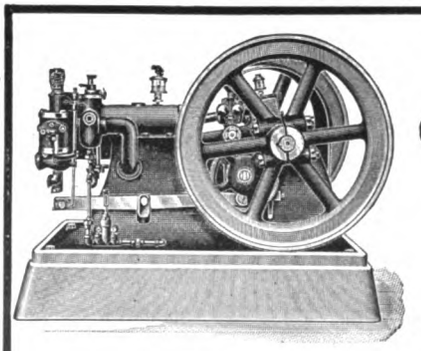
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THE ALAMO

GASOLINE ENGINE

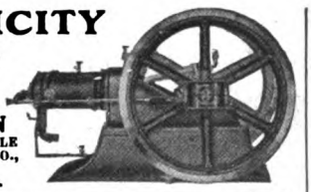
The ideal power for shop or farm. Economical of fuel. Easy to start. Speed regulated while in motion. Built on advanced lines. Satisfactory wherever installed. Send today for Catalog A—FREE—full of information.

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ALL SIZES GET OUR PROPOSITION
WESTERN MALLEABLE & GREY IRON MFG. CO., 8-20 Chase St., MILWAUKEE, WIS.



CASH Always Secures BARGAINS and ALWAYS WILL

Special Net Price on Sarven Patent Wheels (C. B. 50c. extra) with steel and rubber tire

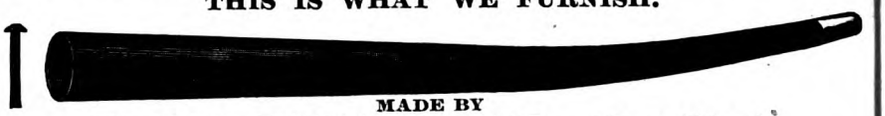
Size of tread	Price per set for wheels with flat steel tire on and hubs bored	Price per set for wheels complete with channel and rubber tire on, and hubs bored. 36 and 40	38 and 40	40 and 44	Add to price of wheels for axles and boxes set
3/4	$6.25	$13.20	$13.40	$13.60	$1.90 L.D.
7/8	6.50	14.50	14.80	15.10	1.90 "
1	6.75	16.00	16.30	16.60	2.10 "
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Repair wheels, $4.50. We will rerubber your wheels for $7.25 Prompt shipments.
Five sets or more, one order you can deduct 25c. per set as freight allowance. Write for catalogue. We manufacture wheels with Steel or Rubber Tire on 3-4 to 4 inch tread. Buggy Gears with wheels and shaft all ready for body, $16.50
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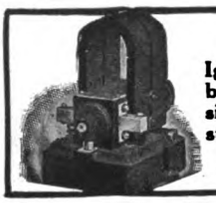


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It is designed to sharpen all sizes and styles of discs. Besides your disc work you can sharpen axes, shovels, plow points, cold chisels, lathe tools, etc. CIRCULARS FREE.
Shipp & Dickerson, Renner, Texas.

THE ORIGINAL DOUBLE TUBE
STEEL SHAFT END
For Repairing Broken Shafts.
Neatly Japanned (look like Leather Covered Shafts) with Nickel Shaft Tip.
THIS IS WHAT WE FURNISH.

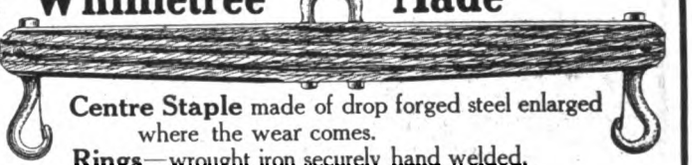


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METAL STAMPING CO., New York.
Send for Catalog containing over 400 different devices made by us for the CARRIAGE AND WAGON TRADE.



HIGHEST GRADE
Ignition Generators do away with EXPENSE and TROUBLE of batteries. Can be easily installed with any engine and is very simple. This Magneto regulates its own speed and furnishes constant spark at all times. INFORMATION ON REQUEST.
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Strongest Whiffletree Made



With Patent Spring Hooks



Centre Staple made of drop forged steel enlarged where the wear comes.
Rings—wrought iron securely hand welded.
Patent Spring Hooks fit any square or round end whiffletree. Ask your dealer for the A. M. W. line, or write for descriptive circular and price list.
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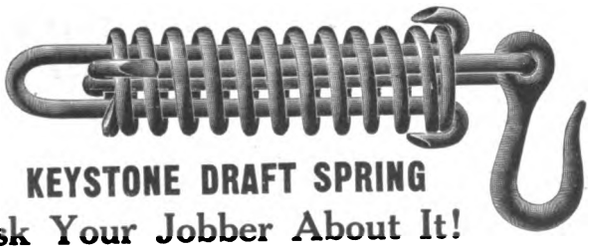
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WE ARE EXPERTS AT REPAIRING OLD WROUGHT ANVILS.
WE ALSO MANUFACTURE THE CELEBRATED ARM AND HAMMER BRAND ANVIL. ASK YOUR DEALER FOR THEM.

- USE HORSE SENSE -



KEYSTONE DRAFT SPRING
Ask Your Jobber About It!
MANUFACTURED BY
RAYMOND MANUFACTURING CO., Ltd.
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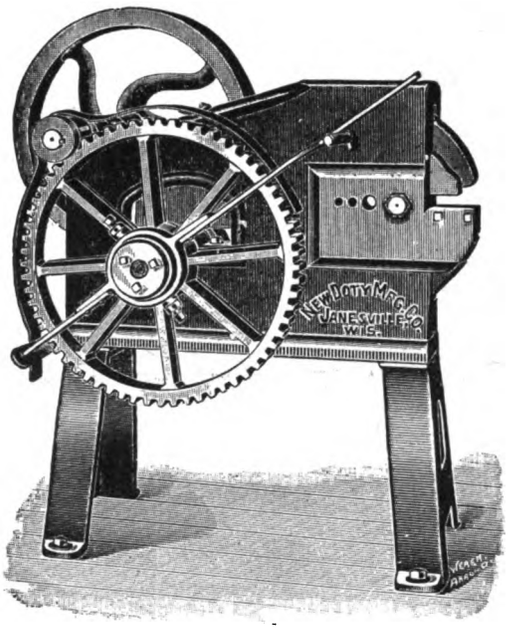
THE KEYSTONE TRACE OR DRAFT SPRING RELIEVES THE HORSE OF ALL THOSE JARS CAUSED BY THE UNEVENNESS OF THE ROAD AND WHEN TAXED TO ITS FULLEST CAPACITY SIMPLY CLOSES, THUS FURNISHING A SOLID CONNECTING LINK AND AVOIDING ALL POSSIBILITY OF BREAKAGE.
LOOK INTO IT!

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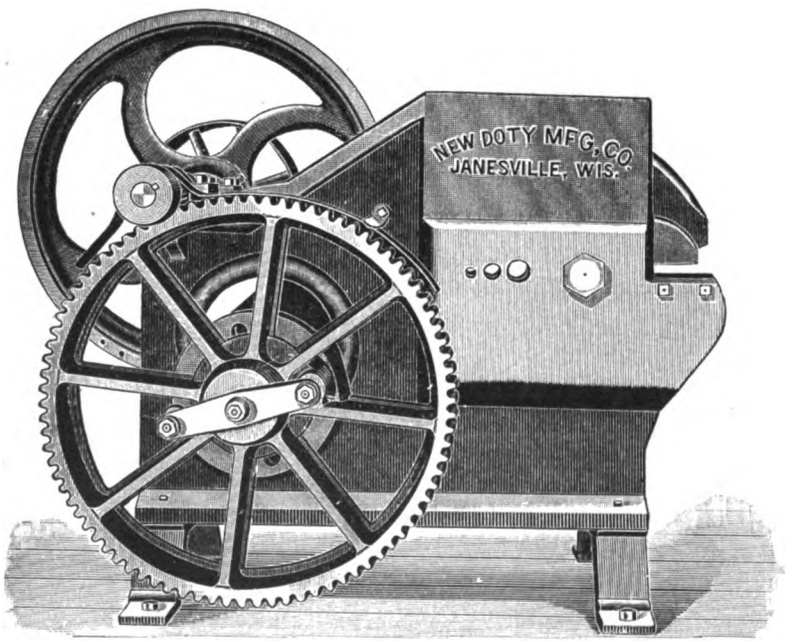
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No. 7 Series Alligator Shears

MADE IN
SIX SIZES



THESE machines are very strong and powerful. The knives for flat and round iron are independent of each other, and are always ready for use. The round iron knives are made the reverse of the iron and so do not flatten it in cutting.



THE eccentric is of such a shape that there is a slight pause after each stroke to allow the operator to adjust the metal for the next stroke.

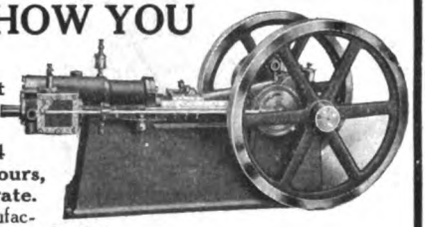
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ARE YOU FROM MISSOURI? WE CAN SHOW YOU



The Robertson Six Horse Power Straight Line Engines develop 7 5-10 H.P. on brake test and costs only 24 cents per day (ten hours, distillate fuel) to operate. Works on natural or manufactured gas, gasoline, alcohol or distillate.

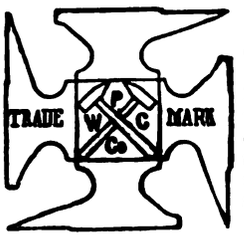
The simplest and most desirable engine on the market. This engine is the power for blacksmiths and wheelwrights. No trouble to start. Always reliable. **If you want an engine of value, write for prices today.**

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YOU WILL NEVER FAIL

To Make a Strong, Clean Weld If You Use Perfection Welding Compound.

We invite you to give our Compound a thorough test, and will ship any amount to any address for that purpose. If it does not prove just as represented we pay all expenses.



Perfection Welding Compound will do the trick quickly and neatly. It makes a stronger weld than any other compound manufactured, as proven by the tests it has undergone. Send for free sample.

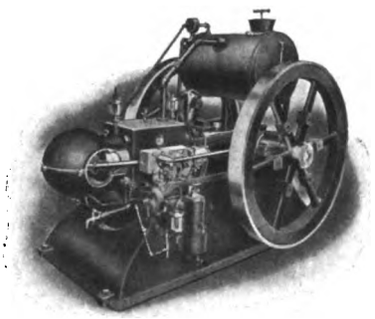
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PERFECTION WELDING COMPOUND CO., SCRANTON, PA.

I have worked with a great many kinds of hand bellows and blowers, but the No. 200 Buffalo Hand Blower is certainly the best on the market. No brother blacksmith can regret purchasing a No. 200 Buffalo Hand Blower.

WILLIAM C. MYERS, Ripley, Ind.

LIGHTNING GASOLINE ENGINES



Steam Cooled
Double Piston
No Foundation

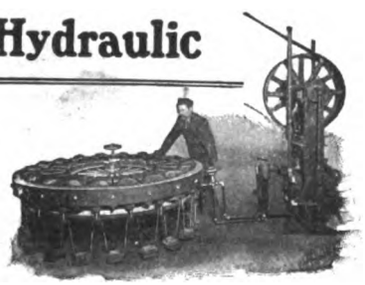
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INVESTIGATE THE

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Before You Buy a Tire Setter



National Machine Co.

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THE SCIENTIFIC HYDRAULIC TIRE SETTER



IS WHAT YOU WANT.

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HAY-BUDDEN SOLID WROUGHT ANVILS

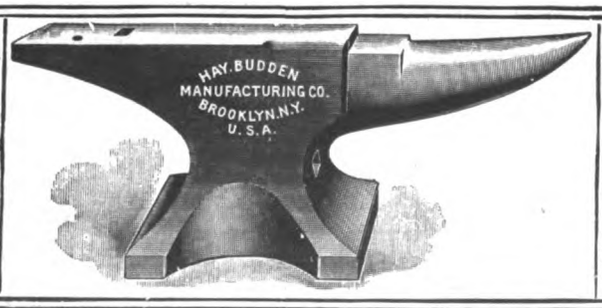
The Gold Medal Anvil

Highest Award

OMAHA, 1898 PAN-AMERICAN, 1901

Every Genuine "Hay-Budden" Anvil is made of the best *American Wrought Iron* and faced with best *Crucible Cast Steel.* Every genuine "Hay-Budden" Anvil is made by the latest improved methods.

WEIGHTS FROM 10 TO 800 LBS.



OVER 100,000 IN USE

WARRANTED

Experience has proved their worth and demonstrated that "HAY-BUDDEN" Anvils are Superior in Quality, Form and Finish to any on the Market.

HAY-BUDDEN MFG. CO., BROOKLYN, N. Y.

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VOLUME 6

THE AMERICAN BLACKSMITH

NUMBER 7

GE ... UNIV. OF MICH. APR 15 1907

A Practical Journal of Blacksmithing and Wagonmaking

BUFFALO N.Y. U.S.A.

APRIL, 1907

$1.00 A YEAR
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HOUSE COLD TIRE SETTER

Sets in your shop like a friend to make you a present of every dollar taken in on it.

You can have one if you like, as it costs you less than the price of three days work.

The truth of the above is, it does set a tire in five minutes, thus earning $6.00 per hour. Just count up the hours when you have taken in the price of the machine and see for yourself.

And this statement is not only true, but we will guarantee it and our guarantee is good.

And besides the profit, it does the work so easily and well that you will find it a joy forever.

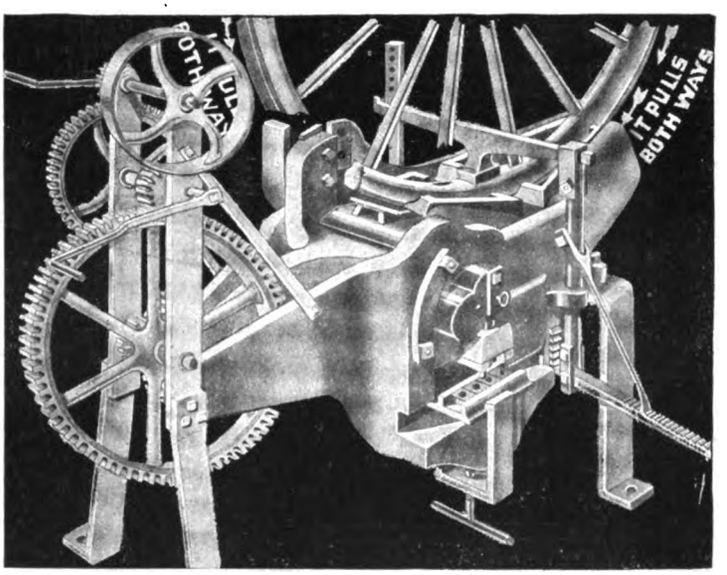
They cannot be broken nor worn out.

Uncle Sam has seen the truth of the above and adopted them.

Now, in consideration of the above why not send us your order?

What can you be afraid of?

There are thousands of them in use and they are in all the States.



800 smiths in our native state have bought them and they are still buying.

We sold them there first, they have tried them well and know what they are.

Our competitors, through their fine ads have sold some machines there too, but they have comparatively all been thrown out. And why not! Just think of a tire setter made with its heads to move on a straight line, instead of moving with the curve of the wheel! They might set tires on square wheels if there were any, but how can they set tires on a round wheel without injuring the wheel?

Remember, we give you the best shear and punch in the world free, and sell our machines cheap and on easy terms.

The House Cold Tire Setter Company,

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WE have had our finely illustrated 1907 Machinery Catalog printed for you. Why don't you send for it NOW?

Don't you see if you keep putting it off, you'll never get it? In two days you could have it, if you send today.

Are you going to let a post-card and two minutes time stand between you and a fat pocket-book?

Don't put it off! Attend to it today—right now. Just say, "Send me 1907 machinery catalog." It describes Drills, Forges, Band Saws, Hub Boring and Spoke Tenoning machines. Don't wait for experience to teach you that you should have written when you saw the ad.

We make the Best—and you can't better the Best.

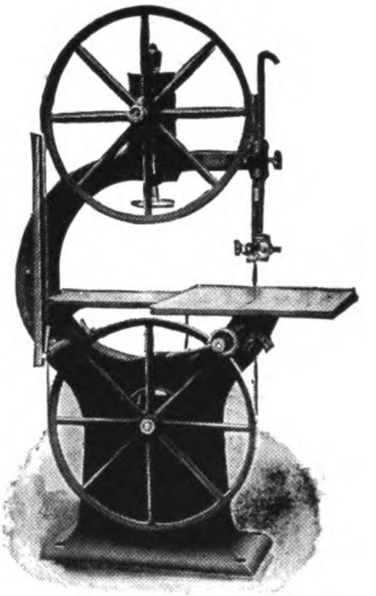
Sllver Manfg. Co.

365 Broadway,

Saiem, Ohio, U. S. A.

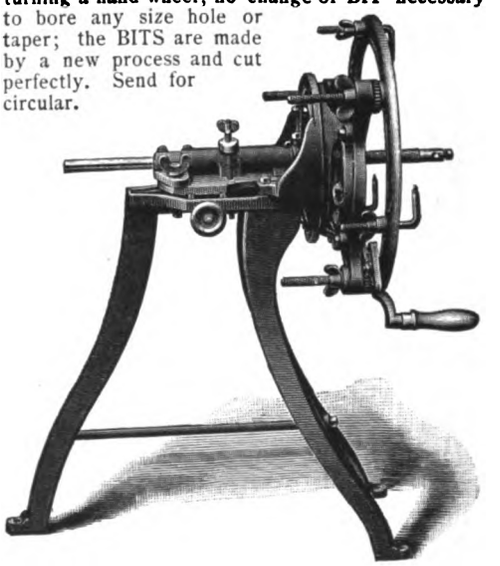
Improved Band Saws

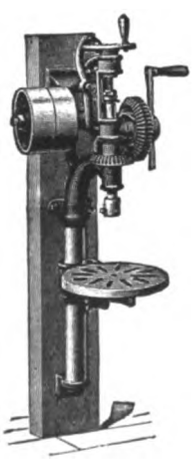
Foot and belt power. New patterns throughout—rigid, symmetrical construction, new table tilting device, perfectly balanced wheels. Belt shifter, adjustment of upper wheel, saw guide, tension of saw blade, etc., all within easy reach of the operator. Sizes, 20 to 36 inches.

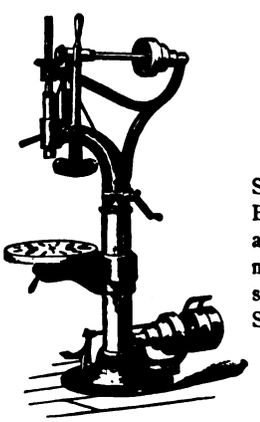


Taylor's New Taper Hub-Boring Machine.

Special Features—Cut of BIT regulated simply by turning a hand wheel; no change of BIT necessary to bore any size hole or taper; the BITS are made by a new process and cut perfectly. Send for circular.

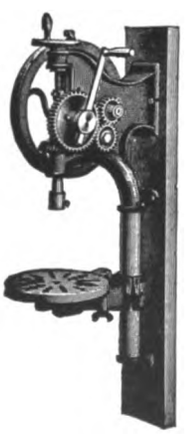






Drills

Swing, Post and Bench Drills for hand and power. Automatic feeding, new simple and efficient. Strong and durable.



Portable Forges

We make 14 kinds of Portable Forges. We have a size to suit your needs. Strong and durable. Attractive designs.



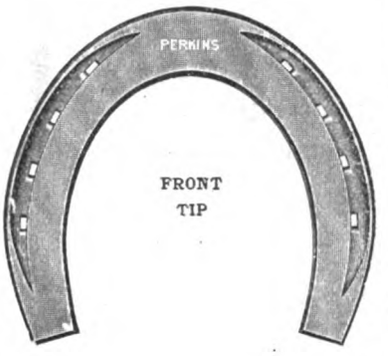
Fig. 901, with Shield.

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HIND
LONG HEEL.

Look for this Trade Mark ★ The Star brand beats all others



FRONT
TIP



FRONT
LIGHT.



FRONT
TOE WEIGHT.

★PERKINS★
HORSE SHOES
AND
TOE CALKS
The **SUPERIOR** Kind

Have more points of superiority than any other make. An up-to-date shoe for up-to-date Blacksmiths.



HIND
SIDE WEIGHT.

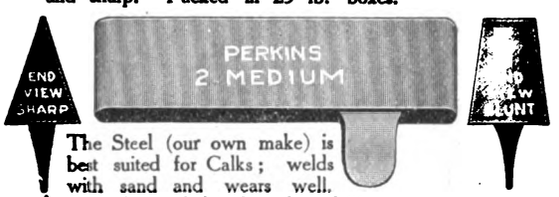
Perkins Shoes have given satisfaction wherever used. Our line is complete and every shoe guaranteed. Made in all styles and sizes. Send for sample. New Pattern Front Extra Light and Light. Free for the asking. We will gladly send

COMPLETE CATALOGUE AND SAMPLES FREE.

WRITE TODAY.

PERKINS

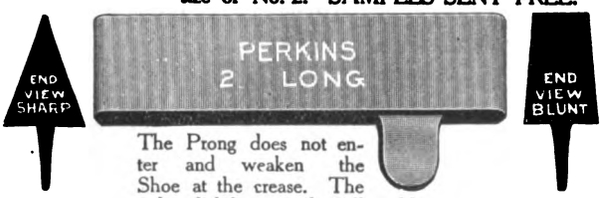
Made in Medium and Long, both blunt and sharp. Packed in 25 lb. boxes.



The Steel (our own make) is best suited for Calks; welds with sand and wears well. Perfectly graded in Length and Size.

TOE CALKS

Chisel Pointed Prong. These cuts show exact size of No. 2. SAMPLES SENT FREE.



The Prong does not enter and weaken the Shoe at the crease. The only slightly curved Calk sold.

MANUFACTURED BY

RHODE ISLAND PERKINS HORSE SHOE COMPANY

PROVIDENCE, RHODE ISLAND.

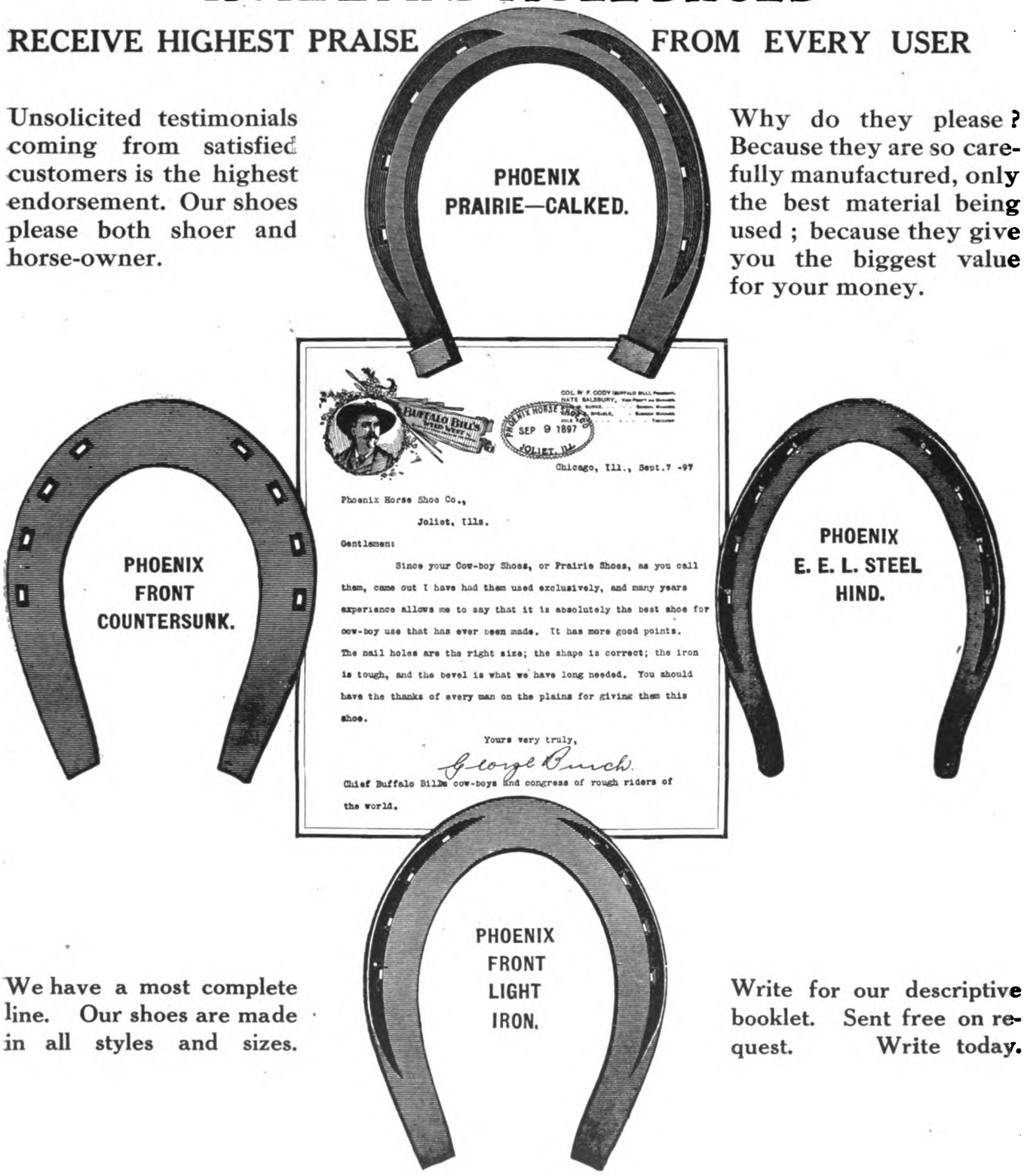
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PHOENIX
HORSE AND MULE SHOES

RECEIVE HIGHEST PRAISE FROM EVERY USER

Unsolicited testimonials coming from satisfied customers is the highest endorsement. Our shoes please both shoer and horse-owner.

Why do they please? Because they are so carefully manufactured, only the best material being used; because they give you the biggest value for your money.



Buffalo Bill's Wild West

PHOENIX HORSE SHOE CO. JOLIET, ILL. SEP 9 1897

Chicago, Ill., Sept.7 -97

Phoenix Horse Shoe Co.,
Joliet, Ills.

Gentlemen:

Since your Cow-boy Shoes, or Prairie Shoes, as you call them, came out I have had them used exclusively, and many years experience allows me to say that it is absolutely the best shoe for cow-boy use that has ever been made. It has more good points. The nail holes are the right size; the shape is correct; the iron is tough, and the bevel is what we have long needed. You should have the thanks of every man on the plains for giving them this shoe.

Yours very truly,
George Bunch.
Chief Buffalo Bills cow-boys and congress of rough riders of the world.

We have a most complete line. Our shoes are made in all styles and sizes.

Write for our descriptive booklet. Sent free on request. Write today.

PHOENIX HORSE SHOE CO.,
CHICAGO, ILL.

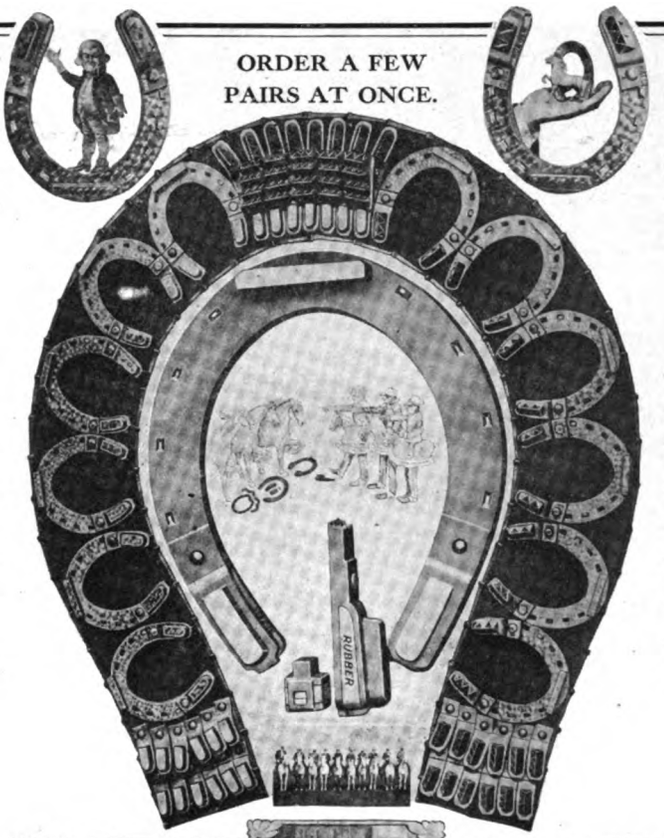
ROLLING MILLS AT POUGHKEEPSIE, N. Y., AND AT JOLIET, ILL.

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A HUMANE DEED is appreciated the **WORLD OVER.**

ORDER A FEW PAIRS AT ONCE.

Therefore our Humane Cushion Heel Horse Shoes DO THE DEED.



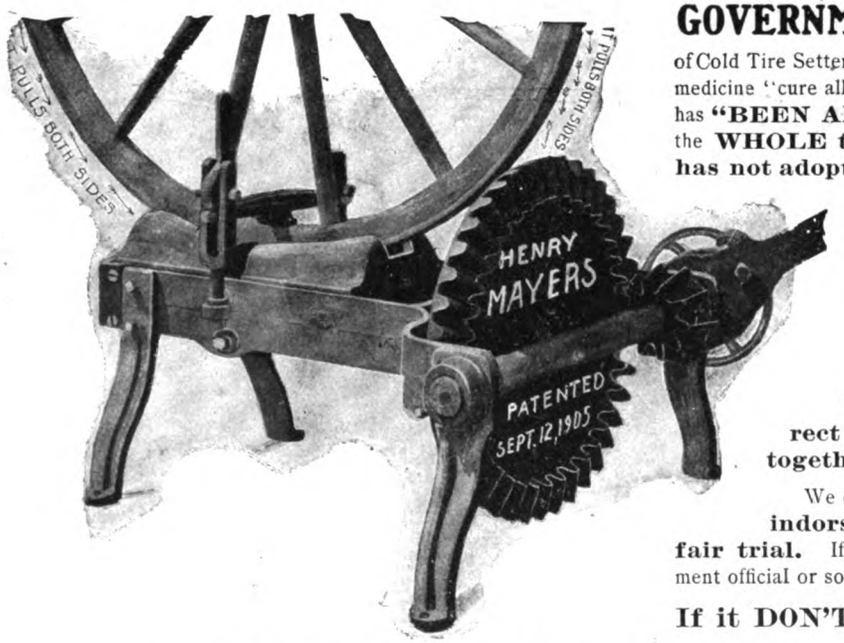
The Smiths who push the Humane Cushion Heel Shoe will get the business. Don't let your neighbor do it first. See their usefulness and watch the dollars roll in. It is a wonderful concussion reducer and action restorer.

Who Got It? We Got It What is It? A Cushion Heel Shoe that prolongs the horse's useful life. A Money Maker for the Blacksmith. And is the Shoe which produces that satisfied look on the customer's face.

It was designed by a practical Smith and has been thoroughly tested and every shoe is guaranteed.



THE HUMANE HORSE SHOE CO., Lima, O.



GOVERNMENT INDORSEMENTS

of Cold Tire Setters are getting to be as **cheap** as patent medicine "cure alls"—as each of two machines claims it has **"BEEN ADOPTED."** (?) The **TRUTH** and the **WHOLE truth** is, **the U. S. government has not adopted** any machine, but some **individual officer** has, and if you are purposely misled about it, then had you not better be careful as to other claims?

We do not ask you to believe a lot of hot air and listen to loud talk.

We have the most substantial, simple, **heavy** and desirable machine made.

The **only one having the correct principle** of bringing **both HEADS together at the same time.**

We do not ask you to buy it on **anybody's indorsement** but your own judgment after a **fair trial.** If it suits **YOU** (not some little government official or some one you never heard of) you keep it.

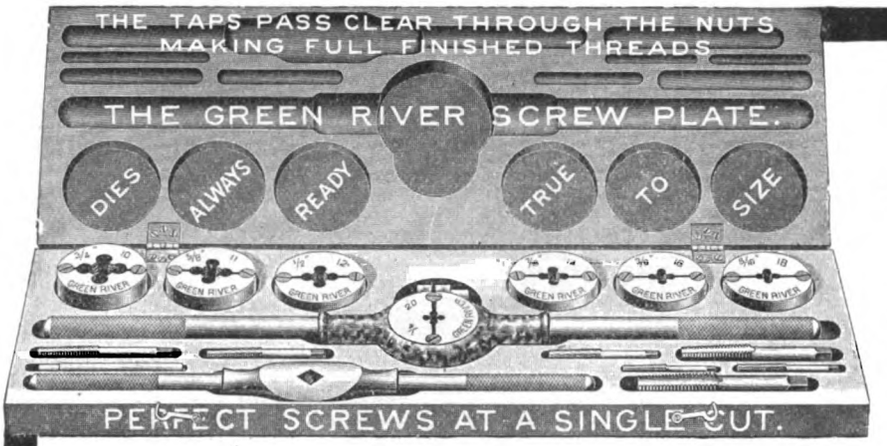
If it DON'T SUIT YOU, don't keep it.

Is this not straightforward, honest, fair business?

MAYERS TIRE SETTER M'F'G CO.,

1721-23 North 8th St. ST LOUIS, MO.

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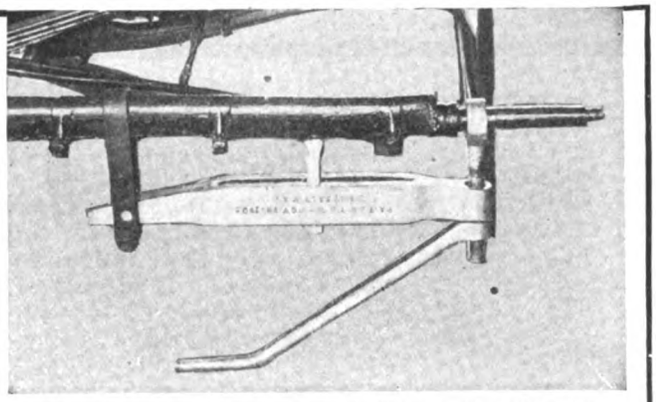
Write for price on the famous SET No. 1½ Green River Screw Plate.

Complete with stock, adjustable tap wrench and sizes of taps, dies and guides (all nicely adjusted) 1-4, 5-16, 3-8, 7-16, 1-2, 5-8, 3-4 inch.

We have sold more of these sets and there are more in use than any other screw plates made.

WILEY & RUSSELL, MFG. CO., GREENFIELD, MASS., U. S. A.

Send for Catalog 33 D.



STEDHAM COLD AXLE SETTER AND STRAIGHTENER.

A Labor and Time Saving Machine that does its work perfectly.

For setting or straightening Buggy Axles and all vehicles having a steel axle. Also Pitman rods of mowers, reapers and binders, bent rods and shafts in section harrows, cultivator beams, shaftings, etc.

The axle can be straightened in the vehicle **cold**, better than to take it out and heat it, and in one-tenth the time. Saves all the trouble of taking the axle out. No scarring of the wood or breaking of the paint.

No blacksmith can afford to be without this labor saving machine. It will bring you business. Your customer does not have to leave his vehicle and come after it a week later. You straighten the axle while he waits.

No matter where the axle is bent, the machine is so adjusted that it may be placed in any position on axle. Up or down, out or in, just a few minutes with the "Steadham Axle Setter" and the job is done. From one to five minutes is all the time required. One man can more than pay for the machine in **one hour.**

Mr. E. A. Glenn of Rockwall, Texas, is one of the many satisfied users. He writes as follows:

Dear Sir:—The "Cold Axle Setter" that I bought from you, does the work splendidly. It is the best investment I ever made in my shop.

Further particulars on request. Or will ship at once on receipt of price, $10.00.

W. S. STEDHAM, ROYSE, TEXAS.

SELLING AGENTS { Buffalo Forge Co., Buffalo, N. Y.
Macgowan & Finigan Co., St. Louis, Mo.
Haysler Iron Co., Kansas City, Mo.

A GREAT OPPORTUNITY

DON'T MISS IT

WE HAVE A

SPECIAL PROPOSITION

FOR EVERYBODY WHO DOES CARRIAGE OR WAGON PAINTING

Write for particulars to

DEPARTMENT P

Standard Varnish Works

29 BROADWAY NEW YORK — **2620 ARMOUR AVE. CHICAGO**

LONDON—BERLIN—BRUSSELS

Be sure to address DEPT. P for this special offer

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Buffalo 200 and 306 Blowers

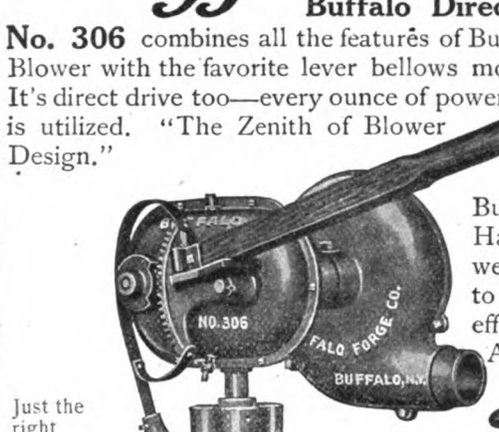
Buffalo Direct Drive Blower

No. 306 combines all the features of Buffalo No. 200 Blower with the favorite lever bellows motion. It's direct drive too—every ounce of power is utilized. "The Zenith of Blower Design."

GUARANTEED FOR FIVE YEARS

GUARANTEED FOR FIVE YEARS

Buffalo Nos. 200 and 306 Geared Hand Blowers are guaranteed to outwear any others on the market and to produce a stronger blast with less effort than any other blower built. Any parts wearing out in five years will be replaced free of charge and no questions asked.



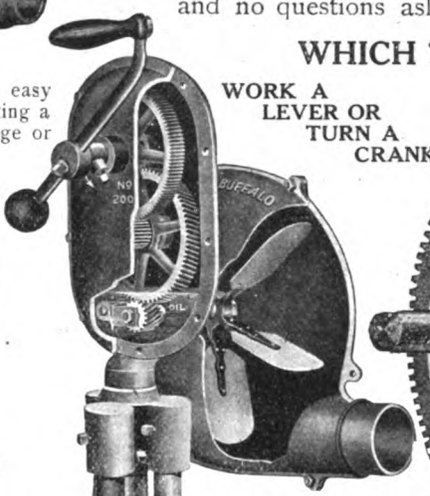
Just the right amount of counter-weight.

On Buffalo Blower No. 306 the counter-balance raises the lever easily and quickly after the downward stroke is completed.

Most natural, easy way of operating a blacksmith forge or blower.

WHICH ?

WORK A LEVER OR TURN A CRANK?



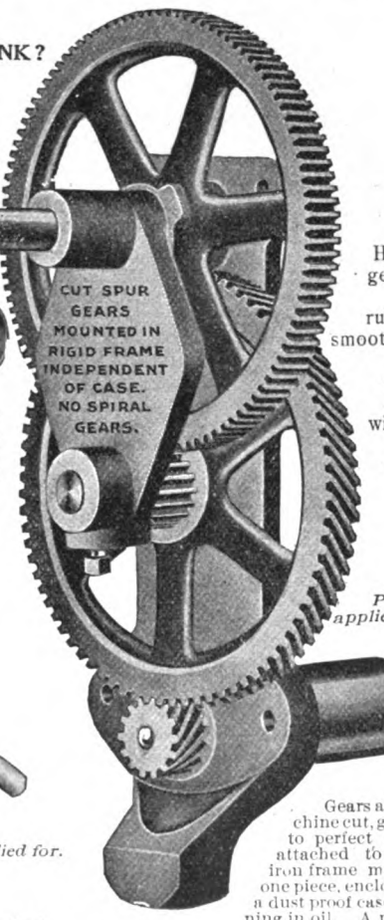
Crank turns opposite to hands of a clock. Cut shows right hand blower—can also be built left hand.

Patent applied for.

Buffalo Direct Drive Blower No. 306 with new H. H. Tuyere.

GEARING.

No Spiral Gears to wear out.



Helical gearing has running smoothness of spiral gear without its wear.

Patent applied for.

Gears are machine cut, ground to perfect finish, attached to solid iron frame made in one piece, enclosed in a dust proof case, running in oil. A perfect self-oiling machine.

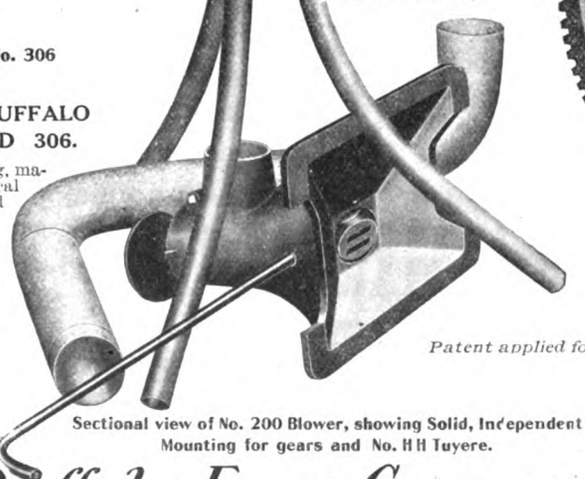
TELLING POINTS OF BUFFALO BLOWERS NOS. 200 AND 306.

GEARS—Heavy, with large, strong, machine cut teeth, cut spur and helical variety, which reduces friction and increases efficiency.

BEARINGS—Bored from solid castings and reamed to gauge, ensuring perfect alignment and easy, silent running.

OILING—Gears constantly run in oil, keeping the working parts perfectly lubricated.

New 1907 Catalog sent on request.



Patent applied for.

Sectional view of No. 200 Blower, showing Solid, Independent Mounting for gears and No. H H Tuyere.

Sold by Best Dealers Throughout Entire World.

Buffalo Forge Company
Buffalo, N.Y.

Canadian Friends Buy of The Canadian Buffalo Forge Co., Ltd., Montreal, and Save Duty.

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V BELLOWS $5

We have in Kansas and Indian Territory about

50

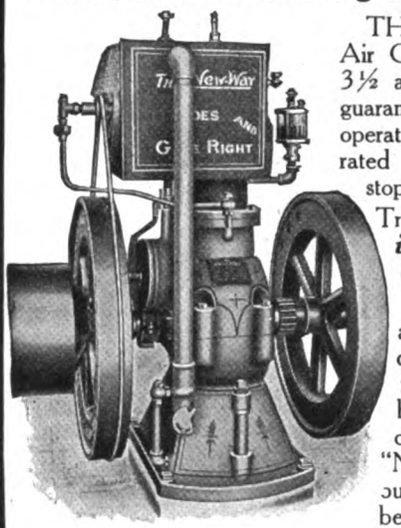
Blacksmith Bellows—sizes 38 in. to 44 in., *Flaccus make.* These are superior to the ordinary Bellows in that they were especially made for Oil country service. They are made from best grade of leather and not from pieces. Owing to the almost universal use of the Steam Blower in the Oil Fields, we have no sale for these Bellows and are offering them subject to prior sale at the remarkably low price of $5.00 each, F. O. B., shipping point.

$5 THIS OFFER WILL BE MADE BUT ONCE. **V**

OIL WELL SUPPLY CO., PITTSBURGH, PA.

Blacksmiths are Good Mechanics

and know that first-class machines are guaranteed to do certain specific things. Wild claims are easy to make, but ***look for the guarantee.***



THE "NEW WAY" Air Cooled Engines, 3 to 3½ and 6 to 7 H. P. are guaranteed when properly operated to pull their highest rated load all day without stopping or overheating.

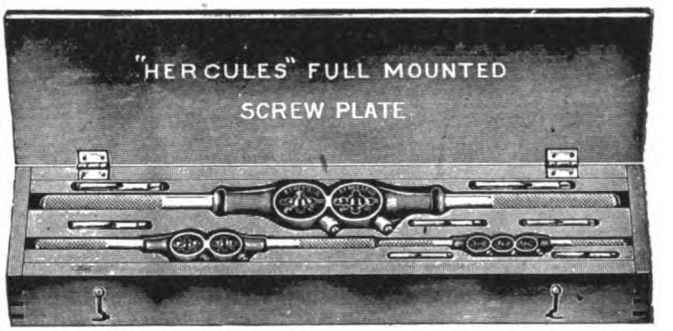
Try to get that guarantee ***in writing*** on any other engine.

No water tank to fill and empty every winter day, one piece cylinder, no packing to leak and blow out, and twenty other reasons why the "NEW WAY" Engines outlast others and are best for Blacksmiths.

Write for special proposition B-1 and save money.

THE "NEW-WAY" MOTOR COMPANY
LANSING, MICHIGAN, U.S.A.
60 SHERIDAN ST.

NONE BETTER MADE



GO WHERE YOU WILL

You cannot find screw cutting tools, superior in quality and material, with keener cutting edges, lower in price or more satisfactory in any way than

HERCULES

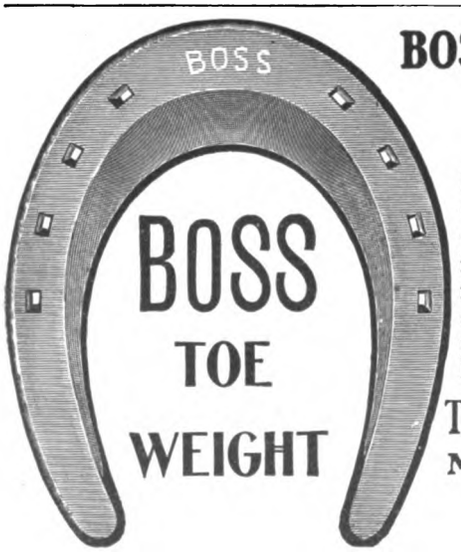
FULL MOUNTED
SCREW PLATES

THEY FILL THE BILL

in every particular. The "Celebrated Reece" kind are used wherever the value of a good tool is appreciated.

Our illustrated catalog is sent free. Write today.

THE E. F. REECE CO.
GREENFIELD, MASS.
U. S. A.

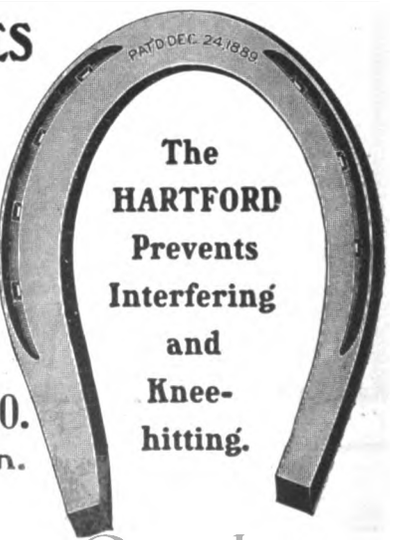


BOSS AND HARTFORD SHOES

CARRIED IN STOCK BY ALL LEADING DEALERS

Have the highest reputation among the trade. Conceded to be the best sideweight and toeweight shoes made in this country. Cost same as inferior makes. Mean less labor. Are far superior to a hand made shoe and always give good satisfaction. Sold by all leading jobbers. Sample pair sent post paid for 50 cents. Send for circulars. They are free. ✕ ✕ ✕

THE SIDEWEIGHT HORSESHOE CO.
Mechanic Street, Hartford, Conn.



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"QUICK ACTION"
IGNITING DYNAMOS
Excel all others!

The only generator that cannot lose its magnetism. For either make and break or jump spark work. Also spark coils. Send for Catalogue B.

The Knoblock-Heideman Mfg. Co.,
SOUTH BEND, IND.

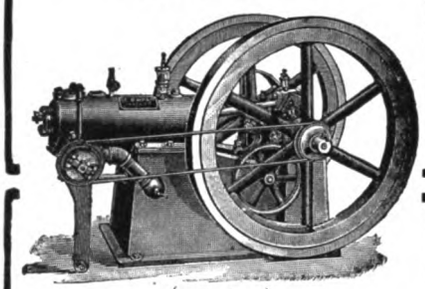
HAUSAUER-JONES PRINTING COMPANY

PRINTERS, ENGRAVERS
BOOK BINDERS

253-257 Ellicott Street, Buffalo, N. Y.

Printers of THE AMERICAN BLACKSMITH, also Complete Equipment for the production of Machinery Catalogues, Stock Farm Catalogues, College Annuals and Catalogues in Foreign Languages, promptly, accurately and tastefully : : : : : : : : : : : :

HAGEN
GAS AND GASOLINE ENGINES



(2-28 H. P.)

ECONOMICAL and RELIABLE POWER FOR THE SHOP-RUNNING BLACKSMITH and WAGON MAKER.

HAGEN ENGINES are recommended on account of their simplicity, durability, comparatively low price, small cost of operating and the ease and certainty with which they can be controlled.

Our Catalogue explains all working parts. A postal will bring a copy to you. It's free. Write today.

HAGEN
GAS ENGINE AND MFG. CO.
Winchester, Ky., U. S. A.

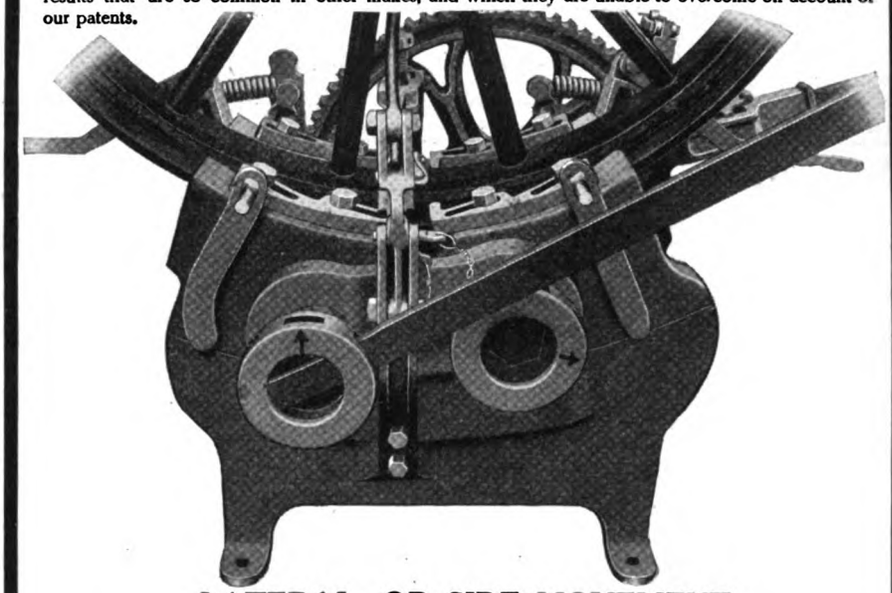
Uncle Sam's Expert Statement

to the Quartermaster General at Washington, D. C., referring to the **BROOKS COLD TIRE SETTER,** reads as follows:

> **" The Superintendent of Transportation and the Blacksmiths in this Department here, pronounce it the best machine for the purpose, giving perfect satisfaction on all the different tires we have in use."**

While it is true they have used others the above is their decision in which they pronounce the BROOKS the **best machine** for the purpose, giving **perfect satisfaction** on all the different tires they have in use.

Get a Brooks, if you want a machine that will give you perfect satisfaction; one that will bring you the tire setting from any otherwise (so-called) competitive cold tire setter, because it does the work right, without the chance of kinking the tire or bending it edgewise, and other dissatisfactory results that are so common in other makes, and which they are unable to overcome on account of our patents.



LATERAL, OR SIDE MOVEMENT

of the Draw Heads is necessary so they may line up with the tire and not bend it edgewise, should one grip key be ahead of the other. **The Brooks is the only machine having this feature.** Our gripping device prevents the keys from slipping on the edge of the tire and bending it edgewise or kinking it. Our guide ways on the base, prevent the Draw Heads raising up and kinking the tire or flattening it. The above are a few of the many improvements found only in the Brooks and which overcome the imperfect way in which other machines do their work. The Brooks is the only complete and practical cold tire setter on the market as established by the best authority and the thousands of blacksmiths who are using them. The best is the cheapest, and you will agree with us that the Brooks has no practical competition, after using it.

Our descriptive Booklet, easy terms and a Handy Vest Pocket Memorandum Book sent you for the asking.

THE BROOKS TIRE MACHINE CO.
121 N. Water St. **WICHITA, KANSAS.**

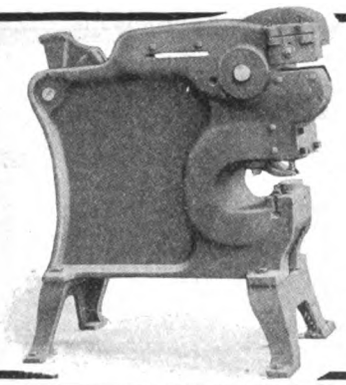
Scott's IXL ALL High Speed Steel

Will cut at least one speed faster than any other high speed steel on the market.

Write for Catalog covering entire line of SCOTT TOOL STEELS.

THE BOURNE-FULLER CO., Cleveland, O.

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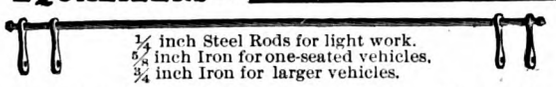
NO. 5 COMBINED PUNCH AND SHEAR.

Punches 5/8 in. hole through 5/8 in. iron.
Shears 5 in. x 1/2 in. flat iron bars.
Sheors 1 1/4 in. round iron bars.
Shears 8 in. x 1/4 in. band iron.

Our large descriptive circular will interest you. So will our price.

Badger State Machinery Co.
19-25 Trinity St. Janesville, Wis.

STEEL EQUALIZERS---FOR SIDE SPRING BUGGIES

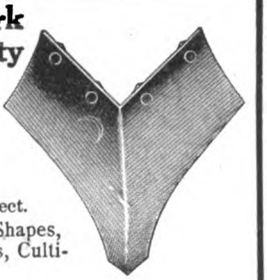


1/4 inch Steel Rods for light work.
5/16 inch Iron for one-seated vehicles.
3/4 inch Iron for larger vehicles.

THE TOPLIFF & ELY CO., Elyria, Ohio.

"CRESCENT" The Mark of Quality





Insist on the "Crescent"
brand and if your jobber cannot supply you write us direct.

We manufacture a full line of High Grade Agricultural Steel Shapes, Fitted and Bolted Plow and Lister Shares, Merchant Plow Shares, Cultivator Blades, Subsoiler Blades, Landsides, etc., etc.

WRITE FOR CATALOGUE.

CRESCENT FORGE & SHOVEL CO., Havana, Ill., U. S. A.

UPRIGHT DRILLS



THE BEST IN THE LAND

These machines are arranged for both hand and power The balance wheel shaft is lengthened and has a three-step cone pulley, 2-inch belt.

The countershaft, with hangers, has a three-step cone pulley, and 7-inch tight-and-loose pulleys for 2 1/2 in. belt.

Weight of No. 5, 200 pounds.
Weight of No 6, 255 pounds.
We also furnish Nos. 5 and 6 Drills with tight-and loose pulleys, 7-inch, 2-1/2 inch face applied to balance-wheel shaft,

Nos. 5 & 6.

Write for Particulars.
PRICES ON REQUEST.

Francis Reed Company
43 Hamden St., WORCESTER, MASS.

THE NAVY offers many opportunities to YOUNG MECHANICS: There are vacancies for competent

Electricians, Machinists, Firemen, Blacksmiths, Coppersmiths, Shipfitters, Carpenters and Plumbers.

The pay for these trades ranges from $25.00 to $70.00 a month, with good food, lodging, medical attendance (if sick), and a $45.00 outfit of clothing in addition. Boys over 17 who have partially learned a trade, can enlist in a lower rating and be sent to one of the Trade Schools, or to a Naval Training Station. The many vacancies in the higher ratings offer constant opportunity for advancement in rate and wages, as rapidly as the men are fitted. Apply in person or write to the nearest Navy Recruiting Station, or to

The Bureau of Navigation,
Navy Department,
WASHINGTON, D. C.

Colville, Wash., Feb. 9. '07.

GEO. BARCUS & CO.

Gentlemen:

Yours of Feb. 2nd at hand. I received the stocks February 4th, have them up and have shod one horse in them and have another for Monday morning. I shod a horse in 45 minutes, that I have been throwing before I got the stocks. I took one shoe off at a time, sharpened it and put it back. Before, it took me from two and a half to three hours, and once he laid me up for a week. Will forward more money in a few days.

Yours truly,
C. C. DARNELL.

BARCUS HORSE STOCKS



ARE THE BEST AND CHEAPEST ON THE MARKET

FOR FULL PARTICULARS WRITE

GEO. BARCUS & CO.
Box 61,
WABASH, IND.

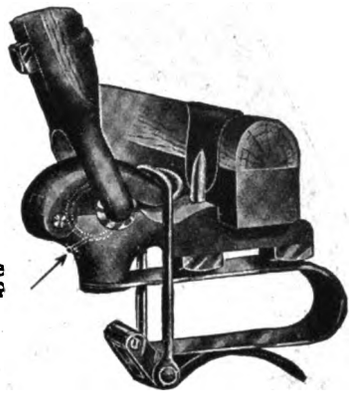
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ECCLES BALL-BEARING COUPLINGS

With Leather Bushings in one piece, securely fastened in the socket of the Coupling.

When the shafts are removed, the bushing does not come out, but stays in the Coupling where it belongs. NO LOST BUSHINGS WHEN YOU USE OUR COUPLINGS.

We would like to send you our circular and have you try our Couplings. They will save you money.



See the Clinch? Pat. applied for

The Spring is pivoted at the front so that it can be turned forward out of the way of the wrench while clipping the Coupling to the axle.

These are two of the good points, but there are plenty more desirable features in our Couplings.

Patented Nov. 25, 1902.

We also have a Catalog showing our full line of **Carriage and Wagon Forgings** all of which we make.

RICHARD ECCLES CO., Auburn, N. Y.

THE BEST TOOL ON EARTH

For a Horse Shoer

Price, $1.75 Each

By Express Charges Paid to any point in United States



THE IMPROVED EASY HOOF TRIMMER

DIMENSIONS.—Weight, 2 lbs., Length, 12 ins., Opens 2 ins., Cuts 1 in. **OUR GUARANTEE.**—If you don't like it you can return it and get your money. **Directions for Using.**—First—Hold the foot in the ordinary manner and remove soft parts from bottom with your toe knife; then with the trimmer begin at the heel and cut down and around the toe and back on the other side, removing the part at one cut and in one piece. Second.—Avoid all wrenching or prying. Hold the tool as near upright as you can. Cut straight through to the blank jaw regardless of nails or other obstructions, and with very little leveling with the knife or rasp your job is complete.

THIS TOOL has been rightly named because it is EASY to adjust, EASY to sharpen, and EASY to convince a horse shoer that it will cut a hoof down easier, quicker and better than any tool he ever saw. It has a detachable knife that can be removed or replaced in a moment. The knife jaw is adjustable by means of screws. When the knife becomes shorter by sharpening, give the screw a turn or so and the reins will go back to the proper distance apart. When knife wears out it can be replaced for a few pence.

CAUTION.—Don't make the mistake that a great many do by grinding bevel on one side of blade, but keep the bevel equal on both sides, so that it will pass through the hoof straight and not in a strain.

Follow above directions and you will soon learn to use THE BEST HOOF TRIMMER ON EARTH.

MADE BY

MUNCIE WHEEL & JOBBING CO.

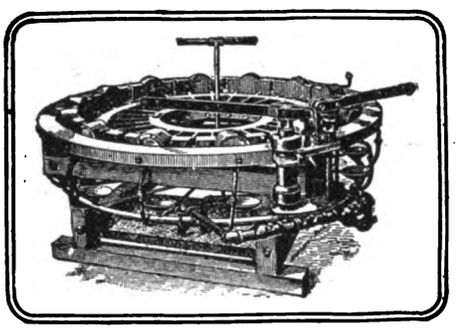
MUNCIE, IND.

Sole Wholesale Agents for British Isles:

THE IRON AND HARDWARE CO., LD.

Gloucester, England

The West Hydraulic Tire Setter



Is a **Round Machine** for tiring **Round Wheels,** and compresses the tire at all points—not all in one spot—and the compression is so slight at any particular point that tire bolts do not have to be removed when resetting an old tire, neither are holes closed so bolts are tight in tire. Wheel is made compact and joints tight.

WRITE US YOUR REQUIREMENTS.

The West Tire Setter Company

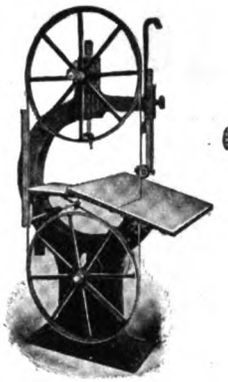
ROCHESTER, N. Y.

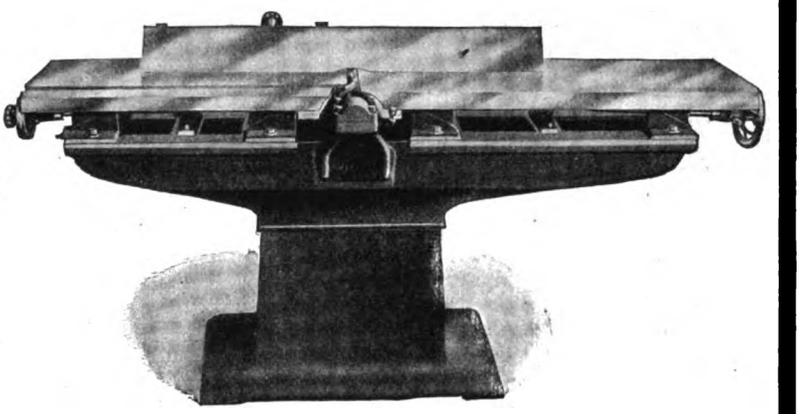
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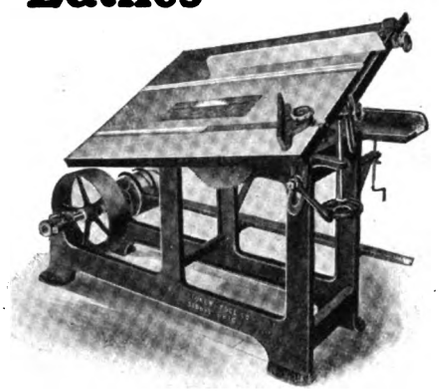


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Band Saws
Cut off Saws
Swing Saws
Rip Saws
Jointers
Lathes







TAKE NOTICE.

If you are in the market for high grade wood working machinery, at very moderate prices, and designed especially to meet the requirements of blacksmiths and wagon makers, write us for our 1907 catalogue.

The Sidney Tool Co., Sidney, O.

1843 **1907**

THE "EAGLE" ANVIL WORKS, Trenton, N. J.

The "EAGLE" is the ONLY ANVIL MADE IN TRENTON.

THE VERY FIRST MADE IN AMERICA.

None Genuine without the Eagle Trade Mark and "Fisher" stamped on side and end.

Cheaper and Better than any others. **More than 200 different patterns.**

PATTERNS.

Regular Blacksmith, Farriers', Farriers' Clip Horn, Plow Makers', Baby Vise and Anvil, Double Horn, Saw Makers', Instrument Makers', Chain and Axe Makers', Etc. Etc. Etc.

Weights from 10 to 800 lbs.

Do you want to be prosperous? Have you pride in your country? Then use an "EAGLE" ANVIL AND VISE, the first made in America. Low in cost and high in value. A **guarantee** goes with every anvil. To meet the demands of everyone, we have recently introduced to the public our **"BABY ANVIL AND VISE"** especially for the use of automobilists. At the Automobile Show, Madison Square Garden, New York, recently, the "Baby Anvils and Vises" were greatly admired and many were sold.

THE "EAGLE" ANVIL

has always taken the FIRST PRIZE at every exhibition wherever entered, from the Gold Medal awarded by the American Institute of New York in 1853, to dozens of others since, including the Centennial at Philadelphia in 1876 and the World's Fair at Chicago in 1893—the latest being that of the National Export Exposition of 1899 in Philadelphia. We have not sought further honors in that direction since: they are really of little interest or value. The practical experience of the working Blacksmith is worth very much more than the opinion of the gentlemen on the Prize Committees, obtained only from a hurried examination instead of any actual knowledge of the anvil's real excellence for work. Our prices are so low and our guarantee so absolute that every Blacksmith buying from us now can get the best anvil in the world for his money.



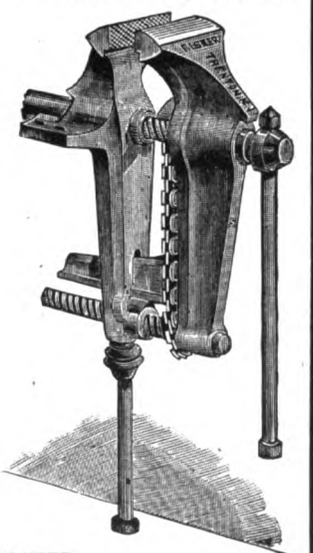
We Make to Order ANVILS of any Special Dimensions or Shape.

Warranted Better than the Best ENGLISH ANVIL.

Face in one piece of **Best Tool Cast Steel, Perfectly Welded,** perfectly true, of hardest temper, and never come off or "settle." Horn of tough **untempered steel** never to break or bend. **Only Anvil made in the United States fully warranted as above.**

Write for Descriptive Circulars and Special Discounts.

Sold only by Reliable Dealers all Over the World.



FISHER DOUBLE SCREW is fully warranted stronger than any other leg vise and always parallel. Is the best vise for machine shops and blacksmiths and for all heavy work. Accurate and durable.

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SOME POPULAR TOOLS

Royal Blower

"The Successful Blower"



Crank Turns Forward or Backward.

Noiseless and Easy to Operate

Gear case is oil-tight and dust-proof. Gears run in a continuous bath of oil.

Gears are Phosphor Bronze and Steel, flat and straight cut. No Spiral or Worm Gears.

Fire-pot is 8x9½x4 inches inside.

A powerful blast; lasting after blast

Fan, 12 inches. Height, 47 inches. Weight, 135 pounds.

Can be furnished to operate with the right arm, for left-handed smiths, when desired.



Royal (Western Chief) Forge No. 100

For use of Large Blacksmith, Wagon, Plow, Railroad Shops, Etc., where Heavy Work is Done, and a First-class Forge and Fire Are Needed.

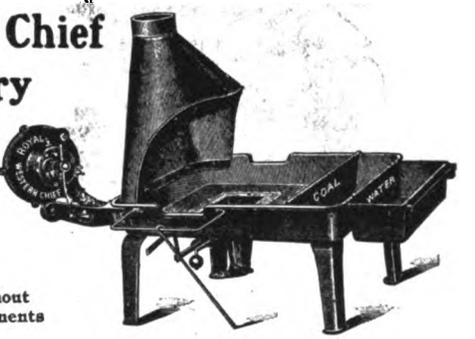
Fan, 12 Inches.
Height, 30 Inches.
Weight, 300 Pounds.
Hearth, 31½ x 48½ Inches.
Length Over All, 83 Inches.

In this Forge we combine our "Royal" style of Blower with Western Chief Standard Hearth, having Solid Fire-pot with Tuyere Ball Furnishing side and center blast. We guarantee it fully.

Western Chief Stationary Forges

Six Different Styles

With or Without Blower Attachments





ROYAL FIRE-POT

Needs No Clay

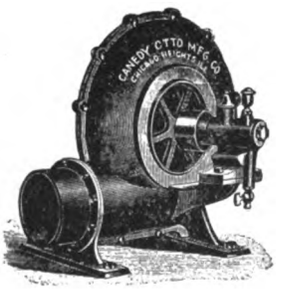
Dimensions 8 x 9½ 4 inches inside

Tuyere Iron

Write for catalogue describing our full line of

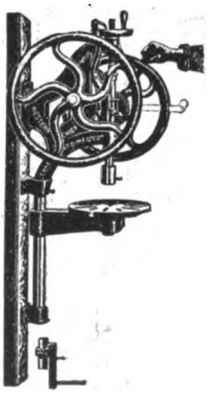
Forges, Blowers and Drills

For sale by first-class dealers all over the world.

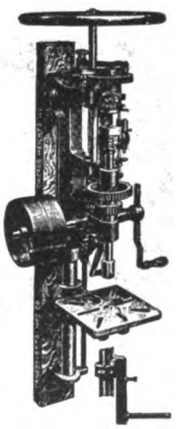


Western Chief Power Blowers

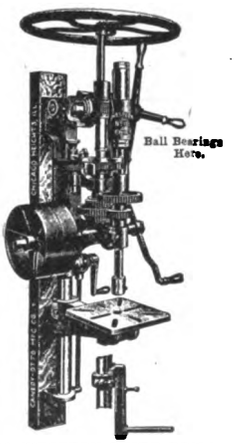
Built in sizes suitable for from one to seven fires



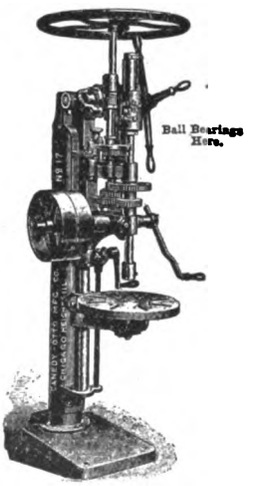
No. 15 WESTERN CHIEF DRILL.
Automatic Self-Feed.
19 in. Circle.



No. 14 WESTERN CHIEF DRILL.
Automatic Self-Feed, and the only AUTOMATIC Quick Return Post Drill Made. 21 in. Circle.



No. 16 WESTERN CHIEF DRILL.
Automatic Self-Feed and Hand Lever Feed. Largest Post Drill Made. 24 in. Circle.



No. 17 WESTERN CHIEF DRILL.
Automatic Self-Feed and Hand Lever Feed. 24 in. Circle.

MADE BY **CANEDY-OTTO MANUFACTURING CO.**

CHICAGO HEIGHTS, ILLINOIS

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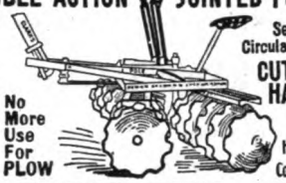
DON'T BUY GASOLINE ENGINES

UNTIL YOU INVESTIGATE "THE MASTER WORKMAN," a two-cylinder gasoline, kerosene or alcohol engine, superior to any one-cylinder engine; revolutionizing power. Its weight and bulk are half that of single cylinder engines, with greater durability. Costs Less to Buy—Less to Run. Quickly, easily started. Vibration practically overcome. Cheaply mounted on any wagon. It is a combination portable, stationary or traction engine. SEND FOR CATALOGUE. THE TEMPLE PUMP CO., Mfrs., Meagher and 15th Sts., Chicago. THIS IS OUR FIFTY-THIRD YEAR.

Cutaway Tools for Large Hay Crops.

Three of **Clark's Intense Cultivators** produced this year on 14½ acres 102, tons of well dried Alfalfa Timothy & Red Top hay. If you want to know how

CLARK'S DOUBLE ACTION JOINTED POLE CUTAWAY HARROW



Send for Circulars to the CUTAWAY HARROW CO., Higganum, Conn., U.S.A.

THROW OUT THAT BATTERY

THE Apple Automatic Sparker

that causes so much trouble on your gas engine, and install an **Apple Automatic Sparker.** No switches, no belts, no batteries for starting or running. A dynamo that produces a strong, steady current and furnishes a fat, hot spark at all times.

Write for information.

DAYTON ELECTRICAL MFG. CO.
152 St. Clair St DAYTON, OHIO.



A low wagon at a low price. Handy for the farmer. Will carry a load anywhere a horse can travel.

Low Down Wagons

soon earn their cost on any farm.

Steel Wheels



for farm wagons. Straight or staggered spokes. Any size wanted, any width of tire. Hubs to fit any axle. For catalogue and prices, write to

Empire Mfg. Co., Box 300, Quincy, Ill.

LIGHTEN YOUR LABORS

BY USING A

STANDISH FOOT-POWER HAMMER.

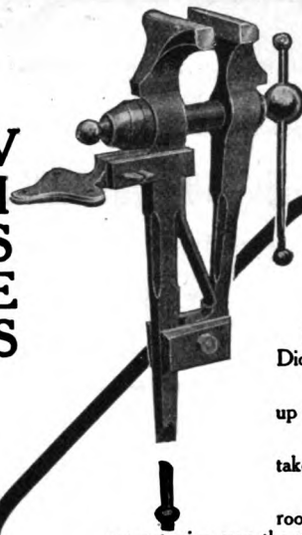
Takes the place of a helper. You can do more work and better work.



Our Power Hammers give perfect satisfaction wherever used and they are doing good work in the best shops in the country. Drop us a card and we will send you interesting descriptive circulars free. Write at once—today.

The Standish Machine & Supply Co.,
COLUMBUS, O.

COLUMBIAN VISES



DID YOU EVER TRY TO SUPPORT AN automobile wife on a wheel-barrow salary?

Presuming you did—didn't you find it unprofitable? Did you ever try to turn out high grade goods with poor tools?

Presuming you did—didn't you strike bottom hard and end up with a sudden jolt that put you on your feet?

Well, if you never did either one of these two fool things, take our warning and don't try it, as you are sure as fate to lose.

There is a good sound reason for our having a large and roomy plant of unusual perfection. It is because we know we can not give you the right kind of tools unless we use the best machinery and workmanship that we can possibly get. You will agree with us this far, will you not?

Here—in our spacious plant with its unchallengeable quality, are made vises and anvils which we call Columbian Original Trenton Wrot-Steel Solid Box Blacksmiths' Vises and Columbian All-Steel Anvils.

The word "Columbian" stamped on any of our products is the best symbol of quality to be found anywhere—it's absolutely guaranteed.

Suppose you had a vise that weighed 50 pounds—that is 50 solid, substantial pounds of good old hard stuff—steel, (and the vise did not weigh 45 or 46 pounds—as do most vises that are marked 50 lbs.) wouldn't it stand to reason that the real 50-lb. vise would help you more in tight pinches and strains without springing out of shape?

Isn't it reasonable that you pay for your vise according to what it weighs? We charge a little more, but in return give you guaranteed quality and a more useful article.

Columbian Vises and Anvils are correctly finished—that is, carefully painted and wrapped—highly polished.

Well, this is enough—if you are not thoroughly convinced now send for our catalog No. 16. It's interesting and educating. Sent free—anywhere.

If our Anvils could speak they would issue soft, silvery notes.



THE COLUMBIAN HARDWARE COMPANY CLEVELAND OHIO

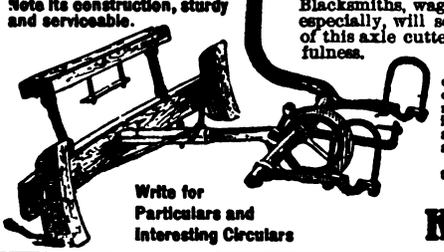
BRANCHES
168 Church St. NEW YORK
26 E. Lake St. CHICAGO

ANVILS

KELLER ECCENTRIC BRAKE

Warranted to lock wheels with three ton load with ease; can be applied to any wagon. Works without aid of rachet. Made in two sizes.

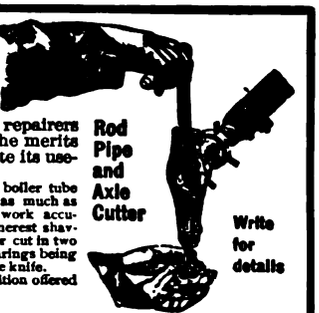
Notes its construction, sturdy and serviceable.



Blacksmiths, wagon and buggy repairers especially, will see at a glance the merits of this axle cutter and appreciate its usefulness.

It will cut a pipe, boiler tube or shaft, as little or as much as desired and do its work accurately, taking the merest shaving from the end or cut in two at any point, its bearings being all on one side of the knife.

Attractive proposition offered to live agents.



Write for details

Write for Particulars and Interesting Circulars

Keller Mfg. Co. Sauk Centre, MINNESOTA.

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YEARS  AGONE

Men were satisfied with old fork wrench methods—now, it is simply a needless waste of time, temper and "knuckle skin" to handle tire-bolts with any ordinary wrench, when a little "Bay State" can be had that will so quickly (and so "slickly") set up or release such bolts. Blacksmiths, Wheelwrights and "Horse Sense" people in general, who have once met a "Bay State," never use any other sort.

THE BAY STATE CARRIAGE AND TIRE BOLT RATCHET WRENCH.

If your dealer don't have them, write us for tool lists for busy men.

TUDOR MANUFACTURING CO., Worcester, Mass.

"MORSE" DRILLS





FOR.

BLACKSMITHS' USE with Round or Flattened Shanks

DRILLS WITH INCREASE TWIST
DRILLS WITH PARALLEL WEB
DRILLS WITH CONSTANT ANGLE
DRILLS OF HIGH SPEED STEEL
(Our own special brand.)

ALSO

REAMERS, CHUCKS, MILLING CUTTERS, TAPS, DIES, MACHINERY and MACHINISTS' TOOLS.

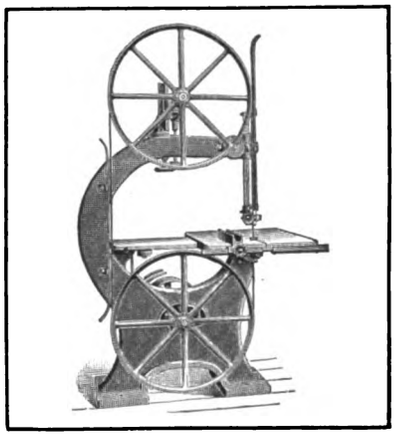
Morse Twist Drill and Machine Co.,

NEW BEDFORD, MASS., U. S. A.

YOU NEED Wood Working Machinery.

Wood Working Machines in your Shop will enable you to do better work and more of it than you can do with hand tools.

We Build Just the Machine You Need.

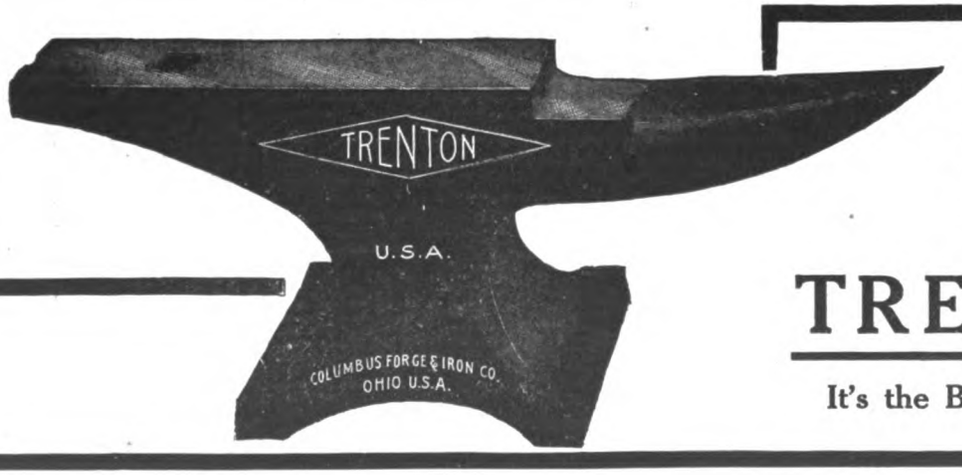


Catalog describing a fine line of moderate priced BAND SAWS, SAW TABLES and JOINTERS mailed on request.

SEND FOR IT NOW.

The Crescent Machine Co.,

245 Main St. LEETONIA, OHIO, U. S. A.



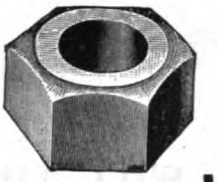
BEFORE YOU BUY AN ANVIL HAVE YOUR DEALER SHOW YOU THE

TRENTON

It's the Best Anvil Made.

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SOME HOT PRESSED NUTS



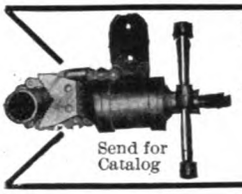
Are so rough looking that a good mechanic hates to use them. The "Milton" brand are not that kind. They are made as good as it is possible to make a Hot Pressed Nut. They have the tensile strength of the best of iron and they are manufactured by a process that finishes them in good shape for honest service. Some of our buyers think they are good enough for any kind of work. We would like to have you try them when in need of anything in this line.

THE MILTON MANUFACTURING CO., Milton, Penna.

We also make Cold Punched Nuts, Washers, Refined Bar Iron, etc.

HONEST DEALINGS.

Before an advertisement is accepted for this Journal, inquiry is made concerning the standing of the house signing it. Our readers are our friends and their interests will be protected. As a constant example of our good faith in **American Blacksmith** advertisers, we will make good to subscribers loss sustained from any who prove to be deliberate swindlers. We must be notified within a month of the transaction giving rise to the complaint. This does not mean that we will concern ourselves with the settlement of petty misunderstandings between subscribers and advertisers, nor will we be responsible for losses of honorable bankrupts.



Send for Catalog

Hang It!

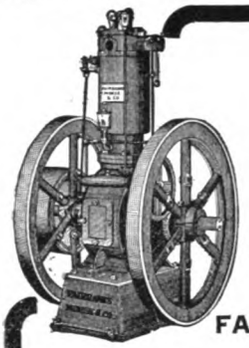
Anywhere to anything

The "PITTSBURGH" Portable Pipe Vise

Weighs but 15 lbs.
Holds pipe ⅛ to 6 ins.
Swivels lock automatically

The Pittsburgh Auto. Vise & Tool Co., Pittsburgh, Pa.





Look Ahead

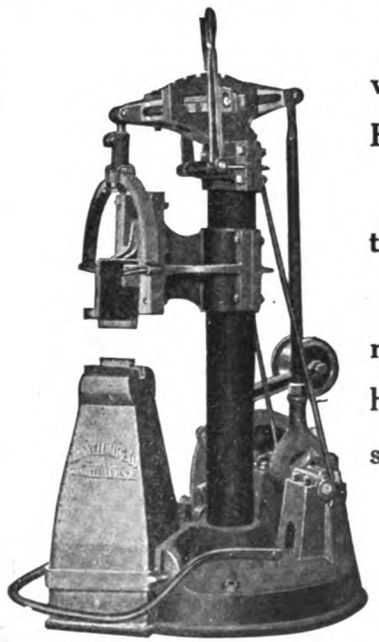
The far sighted blacksmiths are closing their 1907 contracts for

Fairbanks-Morse Gasoline Engines

Why not be an agent and install one in your shop where you can show it to the best advantage. They are so **Reliable** and so well known you can't help making money. Send for Proposition No. 487 A. P.

FAIRBANKS, MORSE & CO., CHICAGO, ILL.
12 DEY ST., NEW YORK.

Modern Power Hammer



The ONLY hammer on which you can get a LIGHT BLOW at FULL SPEED.

The shifting lever controls the length of stroke.

Set it in any one of the five notches and then handle the hammer with the treadle the same as any other.

Actually five hammers in one.

Write any jobber or the

THE GRINNELL MFG. CO.,

GRINNELL, IOWA.



SCHOOL BUILDINGS OCCUPIED ENTIRELY BY THE I. C. S.



The Business of this Place is to Raise Salaries

That sounds queer, doesn't it. And yet there is such a place in reality—the INTERNATIONAL CORRESPONDENCE SCHOOLS, of Scranton, Pa., an institution the entire business of which is to raise, not merely salaries—but YOUR salary.

To achieve that purpose the I. C. S. has a working capital of many millions of dollars, owns and occupies three large buildings, covering seven acres of floor space, and employs 2,700 trained people, all of whom have one object in view—to make it easy for you and all poorly paid men to earn more.

Every month an average of 300 I. C. S. students voluntarily report increased salaries. In 1906, 3,260 students so reported. These students live in every section. Right in their own homes, at their present work, the I. C. S. **goes to them,** trains them to advance in their chosen line, or to profitably change to a more congenial occupation.

The same opportunity now knocks at **your** door. What are you going to do with it? Are you going to lock the door in its face and lag along at the same old wages, or are you going to open the door and give the I. C. S. a chance to show you?

To Raise YOUR Salary

Select the position you prefer, write a postal to the **International Correspondence Schools, Box 1302, Scranton, Pa.,** and ask how you can qualify to fill it at a good salary. Be sure to mention the position you prefer.

Foreman Molder	Electrician
Foreman Blacksmith	Architect
Foreman Machinist	Structural Engineer
Foreman Toolmaker	Contractor & Builder
Foreman Pat'nm'k'r	Foreman Plumber
Mechanical Engineer	Civil Engineer
Machine Designer	Surveyor
Mechanical Draft.	Mining Engineer
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Elec.-Lighting Supt.	U. S. Civil Ser. Exam.
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ALL HORSESHOERS WILL FIND "THE CAPEWELL" NAIL THEIR FRIEND.

By a continual, faithful performance of its duty;

By helping smiths in establishing and maintaining a reputation for the highest class workmanship;

By earning and saving money for them in the long run;

"THE CAPEWELL" horse nail has won the Friendship of the thousands of horseshoers in this country, and in foreign lands, who have had an opportunity to fully test its qualities.

PLAIN PATTERN REGULAR HEAD.

PLAIN PATTERN CITY HEAD.

"The Capewell" Nail Should Always be Found in Your Shoeing Box Because it is the most Reliable, Economical and Satisfactory Nail to Drive.

Made by **The Capewell Horse Nail Company**

HARTFORD, CONN.

The Largest Manufacturers of Horse Shoe Nails in the World.

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PATENTS
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HENSEY & GOUGH
122 BROADWAY
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ONLY 60 CENTS Did you ever try to shoe a horse that would not stand still? By the use of my great



Pulley Breaking Bridle you can make the most restless horse stand as quiet as a lamb—even ugly horses, stallions, etc., completely subdued while being shod. Price, **Only 60c postpaid.** You should own one.

Will bring business to you. Send for circular telling all about it.

PROF JESSE W. BEERY, PLEASANT HILL, OHIO.

THE ONLY
NON-SLIPPING
PAD

The Pneumatic Cushion next shoe when in contact with the ground forms a vacuum which positively prevents slipping.

AT ALL JOBBERS.

CONSOLIDATED HOOF PAD CO.

18 Vesey St. NEW YORK.

LAFFITTE WELDING PLATES

HAVE YOU TRIED THEM ?

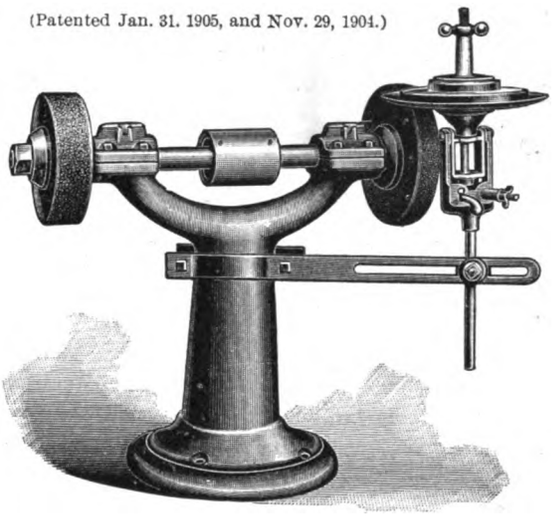
CHEMICALLY WELD IRON AND STEEL AT A LOW HEAT.

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And our Booklet. They will be of interest to you.

The Phillips-Laffitte Co., Penna. Bld'g. Philadelphia, Pa.

(Patented Jan. 31, 1905, and Nov. 29, 1904.)



PERFECTION DISC SHARPENER

Emery Stand Attachment.

This sharpener is neat, durable, compact and economical, and has perfect adjustments. Will sharpen any sized disc with any desired bevel and works noiselessly, **automatically**, and rapidly, without heating or drawing the temper: It sharpens the disc perfectly, requires little attention and pays for itself daily. Can be varied to fit any stand and will last a life-time.

IMPORTANT

You cannot find a sharpener anywhere that will do work as good or require as little labor or attention as this; nor can you find a sharpener anywhere that will pay for itself as quickly as this—a strictly first-class sharpener at small cost. Fully guaranteed. Shipped on trial to responsible parties. For sale by jobbers or shipped direct.

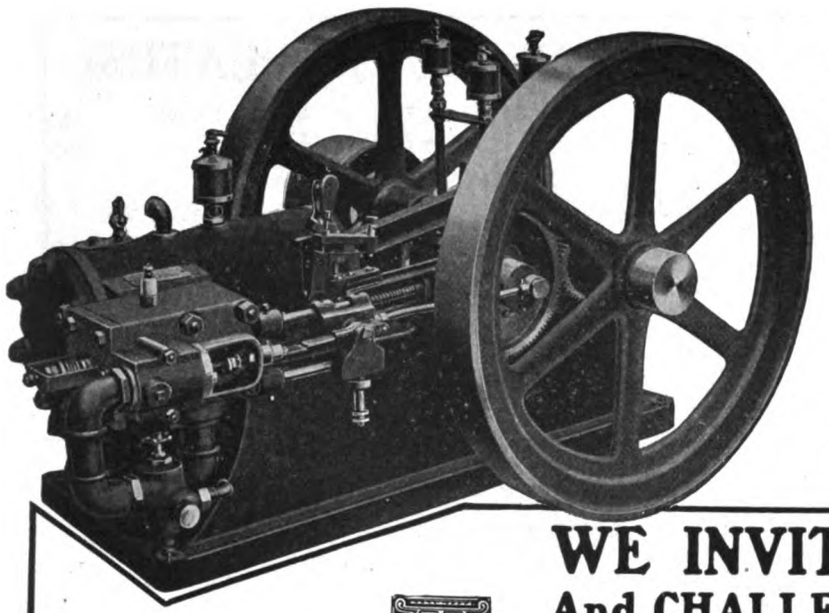
R. M. HAMMOND COMPANY,
DELLVALE, KAS.

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When you ask for an article you have seen advertised in The American Blacksmith, see that you get it. Don't let your dealer sell you something which he calls "Just As Good." Don't let a traveling man talk you into buying an inferior make. The goods advertised in these columns are made by firms whose reliability **we guarantee.** You run no risk whatever in buying these goods. Refuse imitations.

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2 to 25 Horse Power.

Always Ready to Start.

No Engineer Required.

No Increase in Insurance by their use.

WE INVITE INSPECTION And CHALLENGE COMPETITION

OUR "GIANT" 4 H. P. Engine

The Best on the Market for the user of small power. Write for details.

WILLIAMSPORT ENGINES are constructed by the most skilled workmen, and only the very best material used. We offer you an Engine of the Finest Quality, noted for its Simplicity, Durability, Ease of Operation and Beauty of Design. Our broad Guarantee covers all.

ILLUSTRATED CATALOGUE SENT FREE. Write Today.

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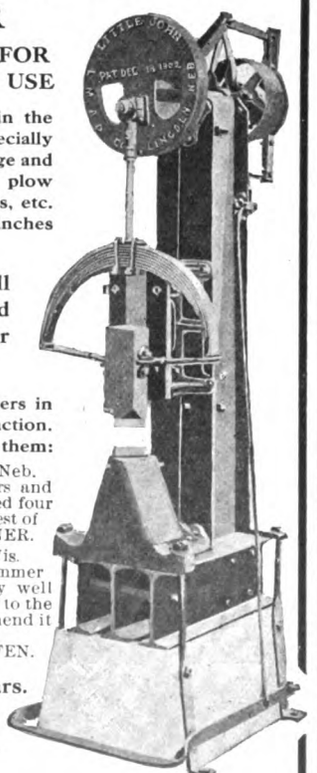
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All Engines Absolutely Guaranteed free from all defects in workmanship and material. Any part found defective or faulty will be replaced by us free within one year from date of purchase.

THE "LITTLE JOHN" POWER HAMMER

DESIGNED ESPECIALLY FOR GENERAL BLACKSMITH'S USE



The dies are set at an angle of 45° in the head which adapts the hammer especially for welding tires, springs, axles, bridge and structural rods and for sharpening plow lays, cultivator shovels, grader blades, etc. You can weld a piece of steel five inches square with it.

The "LITTLE JOHN" will strike a 900 pound blow and take less than one horse power to run it.

There are nearly 400 of these hammers in use today, every one giving satisfaction. Here's what our customers say about them:

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"I have bought one of your hammers and am well pleased with it. I have operated four hammers and I think yours run the best of them all." ANDREW SCHAUPNER.

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"I have used a Little John power hammer for the past three years and am very well pleased with it and can recommend it to the public as being just what you recommend it to be. I would not be without one." JACOB KETTENHOFEN.

Write for descriptive circulars.

SENT FREE.

PRICES ON REQUEST.

Nebraska M'f'g Co., LINCOLN, NEB.

Little Giant

COMBINED

Punch and Shear.

The Most Powerful Lever Punch and Shear Made.

5 Punches and Dies with Each Machine.

MADE IN THREE SIZES.

No. 1—Will punch 5/8-inch hole in 1/2-inch iron. Cuts iron 5/8-inch thick and 1-inch round. Weight, 515 lbs.

No. 2—Will punch 1/2-inch hole in 1/2-inch iron. Cuts iron 1/2-inch thick and 7/8-inch round. Weight, 350 lbs.

No. 3—Will punch 3/8-inch hole in 3/8-inch iron. Cuts iron 3/8-inch thick and 3/4-inch round. Weight, 280 lbs.

Only ONE operation of the Lever does the work. No changing required.

Note the improved Stripper and Hold-down. This machine is made for the blacksmith shop, and we DO claim that it is decidedly the best on the market for that place.



For Sale by your Jobber. If not, Write Us. Send for Circular.

Little Giant Punch & Shear Co., Sparta, Ill.

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TO THE BLACKSMITH.



The Williams Drop Forging Co., realizing a long felt want, have finally perfected a Summer Shoe for all road horse purposes, or Speedway use, which, though light in weight, is, on account of the superior quality of material from which it is made, possessed of much greater wearing properties than any of the old style heavy weight shoes, yet they are so perfect and symmetrically formed that they will satisfy the sharpest critic; and, as they are drop forged, every shoe of a necessity will be exactly the same as another of the same kind and size. Something new, which will prove itself your friend, because it will enable you to do higher class work at easier prices. It will, therefore, prove a friend to the consumer or horse-owner, but its benefits will, essentially and particularly, be for the horse for many reasons, possibly the greatest of which is because he will be shod absolutely right and identically the same every time.

Given every facility for that class of work, some of you might be able to turn out such a shoe. We will leave that for the decision of your good selves, but we are positive that they all will agree that you could not make them profitably at a cost ***double*** the ***price*** at which these will be sold.

The shoe will be handled by all the leading jobbers of blacksmith supplies throughout the United States so far as it is possible, and we will supply direct from the factory all blacksmiths in localities where no agencies are established.

All requests for information regarding these shoes will be cheerfully and promptly replied to by

BITTENBENDER & CO.,

SOLE DISTRIBUTORS,

126-128-130-132 Franklin Ave.,

Scranton, - Pa.

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Cortland Welding Compound Co.

CORTLAND, N. Y.

Manufacturers of

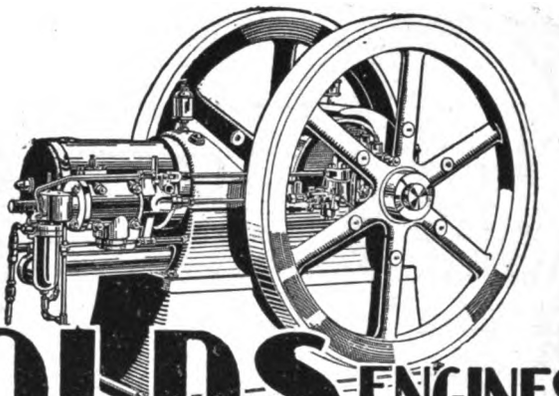
Climax Welding Compound,
Cherry Heat Welding Compound,
and BORAX--ETTE.

BORAX-ETTE FOR STEEL TRADE MARK. A PERFECT WELDING FLUX. PREPARED ESPECIALLY FOR WELDING FAR SUPERIOR TO COMMON BORAX.

BORAX-ETTE makes steel weld easily. It does not have to be applied between the laps like other compounds, but is used the same as borax. It has no equal for all kinds of steel welding.

SAMPLES FREE.

FOR SALE BY DEALERS IN **BLACKSMITHS' SUPPLIES**



OLDS ENGINES

The gasoline engine best adapted to blacksmith work is the Olds Engine. It is simple—requires very little attention—will not get out of order.

Repairs Practically Cost Nothing

It gives an economical power, without bother, and can be depended upon any time it is wanted.

Our catalog tells why this is so—please send for it and hear our story.

We make engines from 2 to 1200 h. p. The one you want at the price you want to pay.

OLDS GAS POWER CO.,

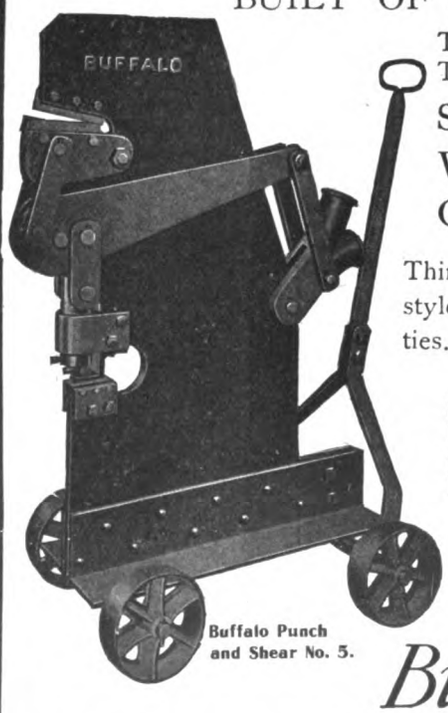
975 Chestnut St. LANSING, Mich.

Buffalo Punches Shears and Cutters

BUILT OF ARMOR PLATE—NO CAST IRON TO BREAK

TENSILE STRENGTH OF ARMOR PLATE 175,000 POUNDS, THAT OF CAST IRON 10,000 POUNDS. THINK IT OVER

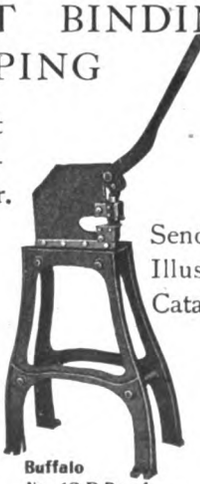
SHEARS ANY LENGTH WITHOUT BINDING OR CRIMPING



Buffalo Punch and Shear No. 5.

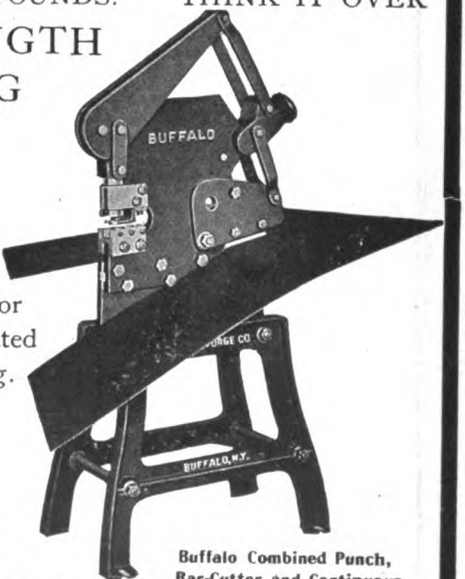
Thirty-five different styles. All capacities. Hand or power.

Sold by Best Dealers throughout Entire World.



Buffalo No. 12 B Punch.

Send for Illustrated Catalog.



Buffalo Combined Punch, Bar-Cutter and Continuous Shear No. 4½.

Buffalo Forge Company

Buffalo, N.Y.

Canadian Friends, buy of our Montreal factory and save duty.

THE CANADIAN BUFFALO FORGE CO., LTD., Montreal, Canada.

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⅔ OF A CENT PER SHOE

AND YOU GET 280 STYLES OF THEM TO SAY NOTHING OF THE OTHER VALUABLE MATTER

THE BEST BOOK of the year on Horseshoeing is

Rich's New Artistic Horseshoeing

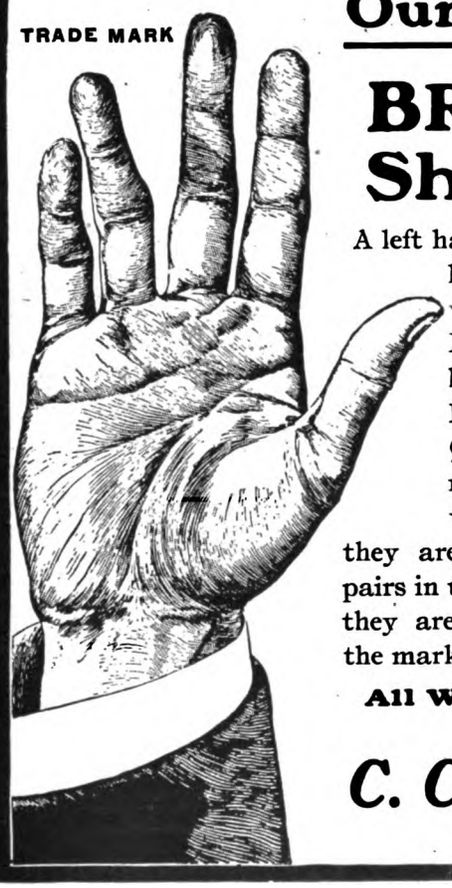
It contains photographic illustrations of over 280 styles of shoes, twelve full page plates (two of which are colored), some 50 half-page engravings, to say nothing of the many smaller illustrations. It contains over 200 pages of practical scientific matter on Anatomy of the Foot, How the Hoof grows, Curing Lameness and Faulty Action, the Bar Shoe, Specific Diseases and Accidents, Formulas, Recipes, Etc. The illustrations are fully explained, plates are indexed and the usage of all shoes fully detailed. It is neatly and substantially bound in green library cloth, and is by no means a low-priced book. A well-known authority on horseshoeing says: **"The book is well worth $5.00."** But we are now selling the few that remain at $2.00. And you'll need to get your order in early for they'll go fast.

If you are not now a regular reader of the American Blacksmith send us $2.50 and we will send you a copy of "Rich's New Artistic Horseshoeing" and The American Blacksmith for one year. But send your order in now—today, before you forget it. Money order, registered letter, stamps or check will do today—you may be too late tomorrow.

AMERICAN BLACKSMITH COMPANY

P. O. BOX 974 BUFFALO N. Y., U. S. A.

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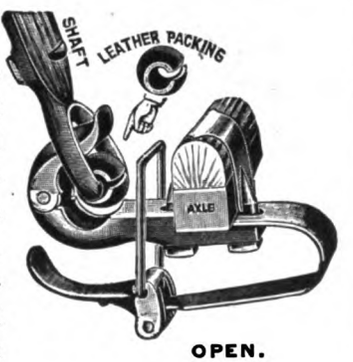


Our Trade Mark

Represents the only Tool required to operate the

BRADLEY Ball Bearing Shaft Coupling.

A left hand will do as well. We are willing to hold up our right hand and swear that we are the original makers of a Ball Bearing, Leather Packed Shaft Coupling, that **Bradley Couplings** are Drop Forged from Bar Steel, are Silent, Quick Shifting, Self Lubricating, Automatically take up their own wear and will outwear any vehicle to which they are attached. There are over a million pairs in use. Quality and advantages considered, they are the cheapest and best couplings on the market.



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CLOSED.

All We Ask is a Chance to Prove Our Statements.

C. C. Bradley & Son,

Syracuse, New York, U. S. A.

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We Manufacture
SHEARS AND PUNCHES
Hand or power, for shearing and punching plates, bars and angles. Send for Catalogue C.
BERTSCH & CO.
Cambridge City, Ind.

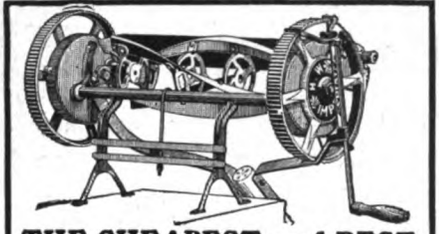
IT'S THE SPARK THAT COUNTS



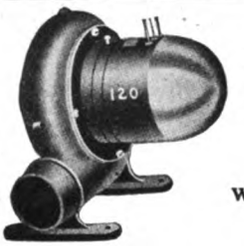
Ignite your engine with our improved
S. L. JUMP SPARK COILS
Guaranteed against all imperfections in workmanship and material. If your engine doesn't work properly, try our system of ignition and your troubles will be at an end. Ask your dealer to show you our coils or write
SHERMAN-LEMKE COIL & SUPPLY CO.
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EACH ONE GUARANTEED
BOLT CLIPPERS
CHAMBERS BROS. CO.,
N. Fifty-Second St.,
Philadelphia, Pa.



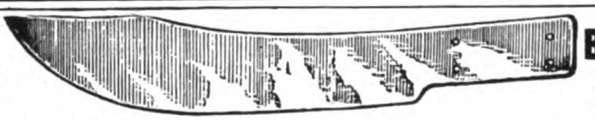
THE CHEAPEST and BEST
Sharpens Mowers in five minutes.
Reversing not necessary,
Malleable Castings. PRICE $1.00
WRITE FOR CIRCULAR.
E. C. Springer & Co., Mason City, Ia.



YOU'RE TIRED AND WORN OUT
FROM USING THAT OLD STYLE HAND BLOWER.
GET A MODERN ELECTRIC
ROTH FORGE BLOWER
AND ENJOY LIFE.
WRITE FOR INTERESTING PRICES AND BULLETIN NO. 1611
ROTH BROS., 27 So. Clinton St., CHICAGO, ILL.

TYPEWRITERS—ALL MAKES
50% to 85% off Manufacturers' Price.
Second Hand and Factory Rebuilt
All machines guaranteed to be in good working order, and shipped for examination.
Title of every typewriter guaranteed—we are responsible.
All makes rented $2.50 to $3.50. Two mos. rental apply on purchase price.
Illustrated catalogue for the asking. State preference of make, if any, and we will send samples of actual work.
THE LERNER-BEAN CO.
15½ East Swan St., BUFFALO, N. Y.

HAND FORGED

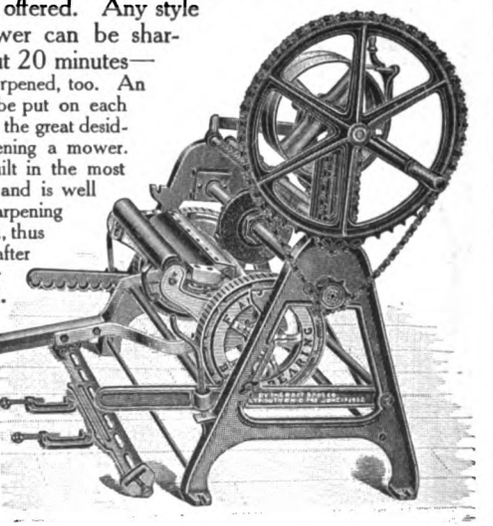


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A GOOD SIDE-LINE
Hundreds of blacksmiths are making large profits by selling these blades. Each one is fully warranted. Made of Sanderson Steel.
Round or riveted. All sizes from 5 to 8 inch.
Handles ready to put on, 1c each.
$ .15 EACH 1.50 DOZ.
Hand Forged Razors, ready to use, 40 cents each.
Pocket Knife Handles in variety, 10 cents each. Send for sample.
WOODWORTH KNIFE WORKS, NUNDA, NEW YORK



FOR STRENGTH SAFETY AND QUALITY OF MATERIAL.
Northwestern Horse Nails
ARE THE BEST ALL AROUND
The most perfect in form and finish. Made of the best Swedish Iron. Will hold a shoe longer than any other nail made. Note the re-enforced point—makes it easiest to drive and the safest to use.
UNION HORSE NAIL CO., CHICAGO, ILL.

THE IDEAL LAWN-MOWER GRINDER
1907 PATTERN
is now on the market and as an adjunct to the Blacksmith Shop or Repair Shop will be found one of the most useful machines ever offered. Any style of Lawn Mower can be sharpened in about 20 minutes—and perfectly sharpened, too. An exact bevel will be put on each blade, and this is the great desideratum in sharpening a mower. The Ideal is built in the most durable manner, and is well adapted for sharpening tools, skates, etc., thus being of service after the lawn-mower season has ended.

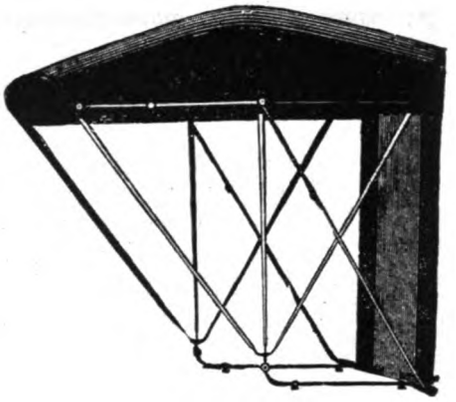


It is a money-maker from the beginning. You cannot afford NOT to have an Ideal Grinder and we can prove it.
WRITE FOR PARTICULARS.
ROOT BROS. CO., PLYMOUTH, O.

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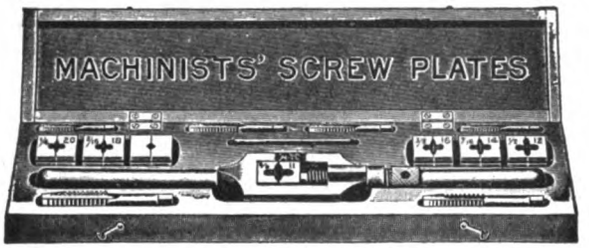
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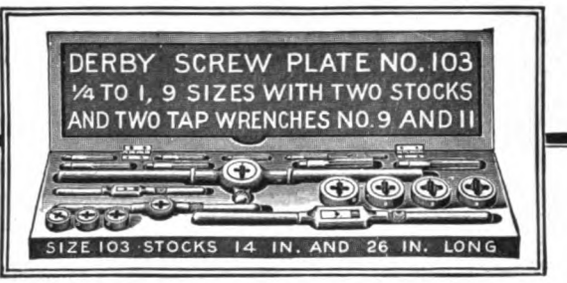
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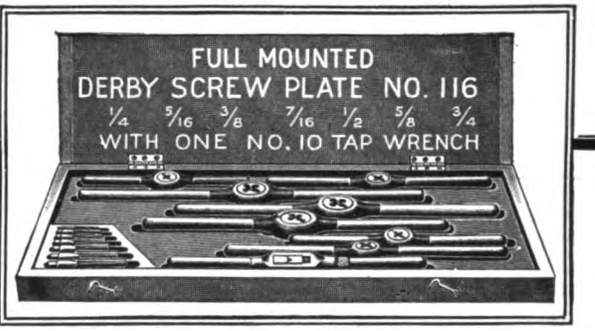
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Were the following letter a rarity nothing would be said concerning it in these columns. But the number of these received, not from our own broad land alone, but from foreign shores as well, prompts us to remark about it here. "We shall be glad to forward the required amount if you can supply the past year's issues, as by the specimen copy we think they would contain some very useful information." This letter comes with a subscription order from a large New Zealand firm of coach builders and shows very strongly just what this firm thinks of the paper. Letters of this kind come in every steamer mail from, Australia, Tasmania, New Zealand, South Africa, England and from all parts of the United States and its possessions. What stronger proof of a journal's worth than orders, not only for future numbers, but for back numbers as well? What other indication need be cited as to the value of THE AMERICAN BLACKSMITH?

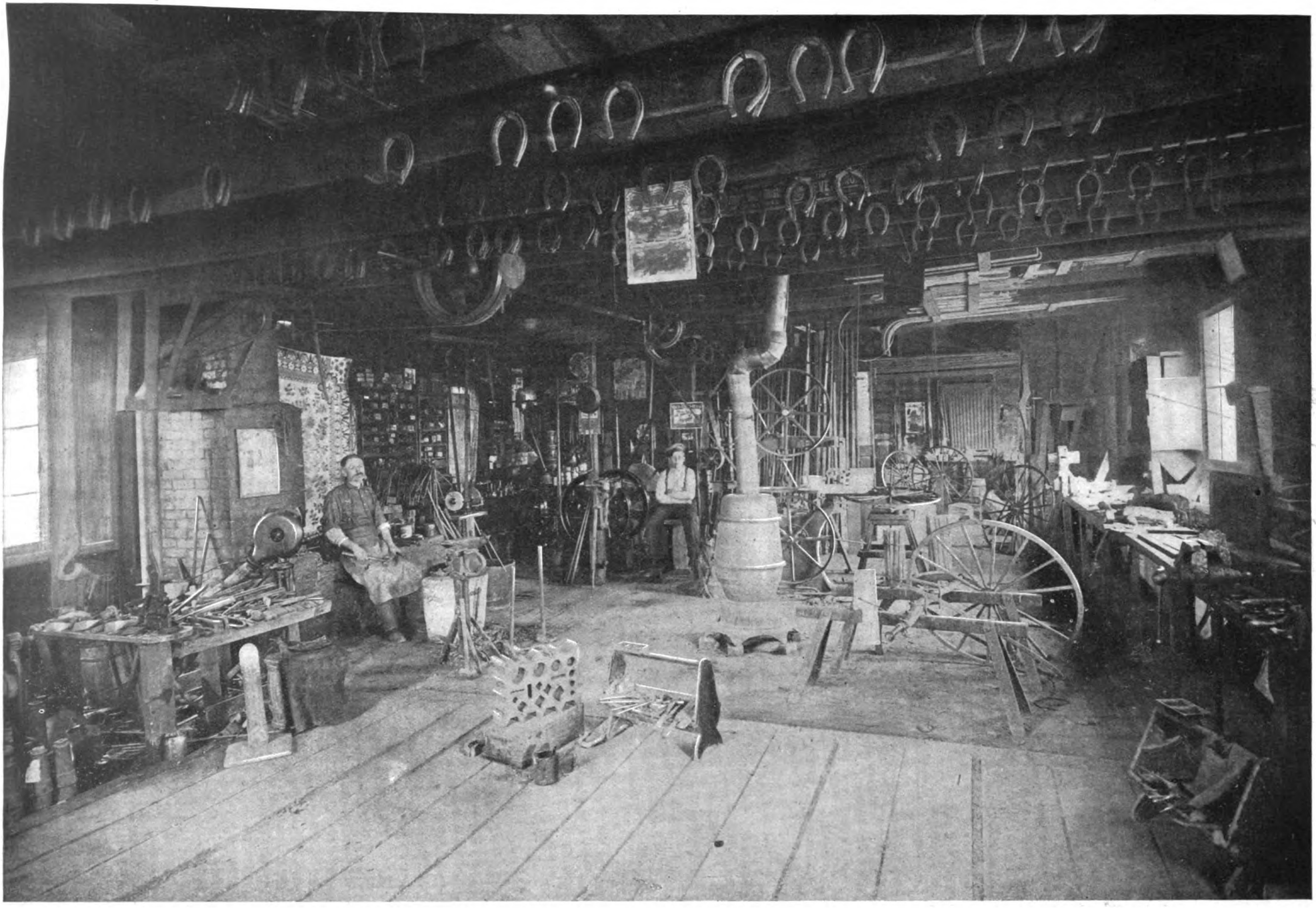
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We have always insisted upon getting out a paper that was for, by and with the craft always, and we have continually improved, enlarged and changed it. But, nevertheless, we want suggestions for further improvement. We want your ideas on the paper. Do you want more continued articles or more short items—more columns devoted to letters from readers? We want you to say what subjects you like best. We want your co-operation in making the paper interesting and valuable. Do you want more space devoted to the Heats—Sparks—Welds department? Would you like more space regularly on association items? Are you interested in horseshoeing, toolsmithing, ornamental work, ship work or forging? Are you satisfied with the present arrangement of the paper? Are there any changes you would like? Do you want the monthly poem discontinued? What departments would you like to see added? These few questions are merely hints. If they meet your suggestions, answer them. If they do not, make your own suggestions. Look through the paper and picture to yourself the several changes you would like to suggest. Just give us a straight-from-the-shoulder letter on what you would do to improve the paper. Don't hesitate to suggest and criticise. THE AMERICAN BLACKSMITH is published for its readers only, and we're here to please our readers and give them what they want. So send in your letter early and let us have your suggestions.

This little timely talk is with those of our readers who have come from foreign lands—those who, having served an apprenticeship in the land of their birth, have come to the United States to practice and to prosper. We ask these readers to send us the names of their smithing friends at home. We want the names of the men with whom you learned the trade; the men at home who are unacquainted with "Our Journal." To these friends of yours we want to send a copy of the paper with your compliments. Let us have your list as soon as possible.

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POWER SHOULDERS THE GREATER PART OF THE HEAVY WORK FOR THE MODERN SMITH. THE MODERN SHOP IS RUN ON MODERN PRINCIPLES

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A WELL-EQUIPPED GENERAL SHOP OF THE PACIFIC COAST

The Smith Shop of Today and Tomorrow

THE PRESENT FORETELLS THE FUTURE



CONCERNING the shop of the past, little need be said. What interests the modern craftsman most is the present and particularly the future of the smithing craft.

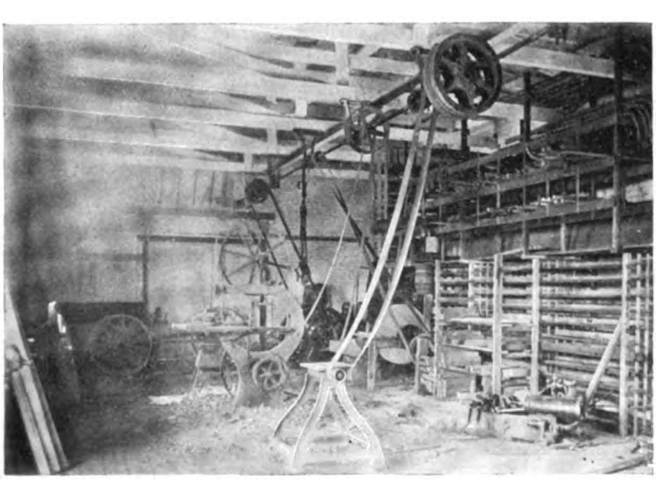
To say that the smithing craft has greatly improved in the past few years is putting the case very mildly. The up-to-date shop of today, with its modern equipment, is hardly recognized as a development of the smithy of years ago. We find the modern shop run on modern business principles. It is more in keeping with the ingenuity and the skill displayed in the smith shop every day.

What is said of the future is not by any means meant to reflect on the present or past conditions of the craft. We wish simply to say what can and should constitute the ideal smith shop. Perhaps the first requisite is order and neatness—a place for everything and everything in place when not in use; the stock in the racks and neatly arranged for easy and quick handling. Don't have shoes of all sizes and descriptions hung all over the shop. 'Tis just as easy to keep the number six plain shoes together, as well as the screw-calk-patents and have all arranged in such order that you can find any size or kind immediately.

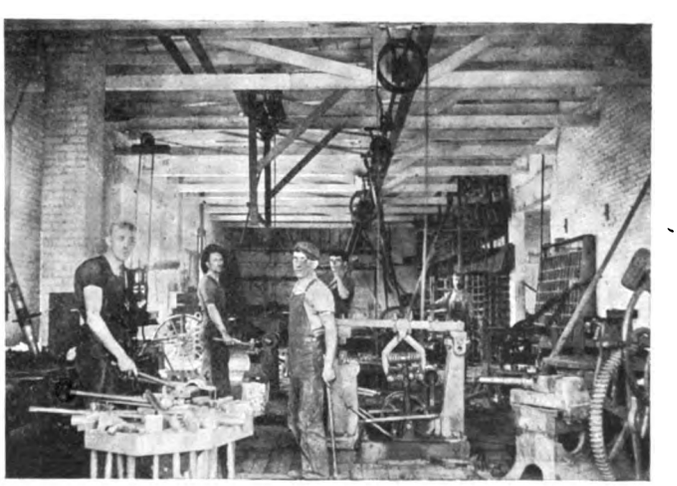
Don't forget the importance of machines practically arranged. Just the other day we came across a shop in which the rip-saw was about as far away from the planer as it could possibly be. Have your machines arranged in the order of use as near as possible. Large industries, plants and factories are so planned as to take in raw material at one end and to deposit the finished product on the railroad platform at the other end, without one backward movement. Modern conditions require this—competition is too keen to allow for any false moves or any unnecessary steps. Rapid handling, quick production and close figuring are possible only by making every movement bring the products nearer the shipping platform and if this system in the arranging of machinery is of such vital importance in large shops, why not carry out the same idea in the equipping of the smith-shop?

Another thing upon which the future of the smith-shop depends very much is the equipment. The shop of tomorrow will be no better than that of today if the equipment of yesterday is allowed to remain. The shop of the present cannot grow on a leaky bellows, a broken drill and a battered anvil. It must have a modern equipment; power is necessary; proper machines are a requirement; labor-saving, time-diminishing, profit-increasing tools are essential. The equipment of the modern shop must be modern in every way.

There are many other points upon

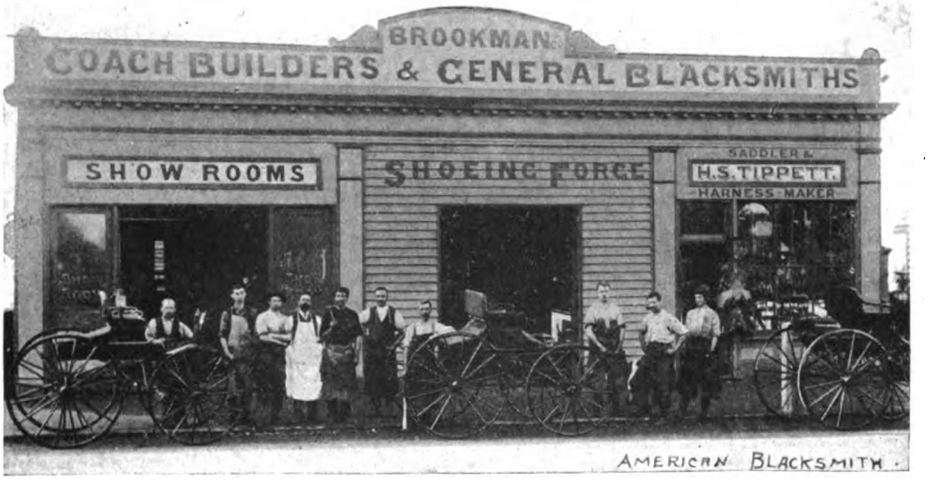


THE WOOD-WORKING DEPARTMENT IN A CALIFORNIA SHOP



THE SMITHING DEPARTMENT IN A CALIFORNIA SHOP

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AN AUSTRALIAN CARRIAGE AND SHOEING SHOP EMPLOYING A GOOD-SIZED FORCE

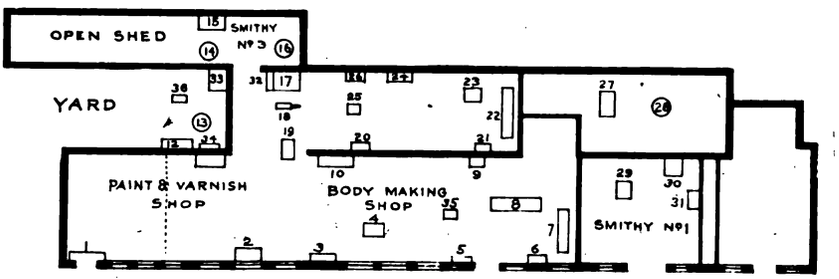
which the future of the craft depends, but as far as the subject itself is concerned, we believe the foregoing covers the subject very well. Much, of course, depends upon the individual shop owner, but, if the smiths will work together and in harmony, there need be little fear as to what the future has in store for the grand old smithing craft.

A General Shop on the Pacific Coast.

E. G. WALKER.

The several engravings show one exterior and two interior views of my shop. I started in business about six years ago with less than $100. I bought a shop and tools for $400 on time, and in less than two years I had it paid for. I was then on rented ground and, as I could not buy the lots, I bought three elsewhere and moved my shop onto them. The first of the year I built a brick shop, 50 by 75 feet, one story high. My shop room is 25 by 75 feet, with a line shaft running lengthwise. I have a carpenter shop behind the brick building. This I rent with power furnished. I have two forges in the smith-shop, and one in the shoeing-shop, besides the following machinery: One Hawk-eye No. 2 power hammer; one Star upsetter, large size; one Ideal Mole upsetter; blower for power and a hand blower for each forge; one emery stand, one thread-cutting machine; one set hand stocks and dies; one Cleveland shears; a drill-press; a 10-inch planer; a Silver 32-inch band-saw; one grindstone; one small lathe; a little Giant hub-boring machine and, in the carpenter shop, I have one cut-off circular saw, one rip saw, one wood lathe and one boring machine.

I have a ten-horsepower Sampson gas engine (Sampson Iron Works, Stockton, Cal.). I have five men besides myself and we do not have any time to sit down and tell stories. I expect to put in another fire next year, as I had more than I could do last summer. I do all classes of work, but mostly repair work. I give you some of my prices:



A CONVENIENTLY PLANNED SMITH AND GENERAL SHOP OF IRELAND

Horseshoeing, plain	$1.50 to $2.00
Sharpening shares	.20 to .35
Pointing shares	.75 to 1.00
Plow handles	.75
Buggy stubs, per set	8.00 to 12.50
Setting axles	1.50 to 2.50
Setting buggy and all inside tires, each	.75
Setting wagon tires under four inches, each	1.00
Setting wagon tires over four inches	1.25 to 6.00

My other prices are, of course, on about the same scale.



THE INTERIOR OF THIS WESTERN PENNSYLVANIA SHOP IS SHOWN IN THE FRONTISPIECE

A Western Pennsylvania Shop.

W. J. WINTERS.

The accompanying engravings show a plan of my shop and also an exterior and an interior view. We are fairly well equipped and do horseshoeing, vehicle work, repairing, painting and general blacksmithing. We have been at this stand for ten years. My equipment consists of 1, the stoves;

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2, a bench-clamp; 3, iron-rack; 4, gas-engine; 5, wheel-jack; 6, bandsaw; 7, drill press; 8, emery stand; 9, forge; 10, tool rack; 11, tire-bender; 12, swage block stand. Our gas-engine is a five-horsepower Fairbanks-Morse. The second floor of the shop is used for storing lumber and other materials.

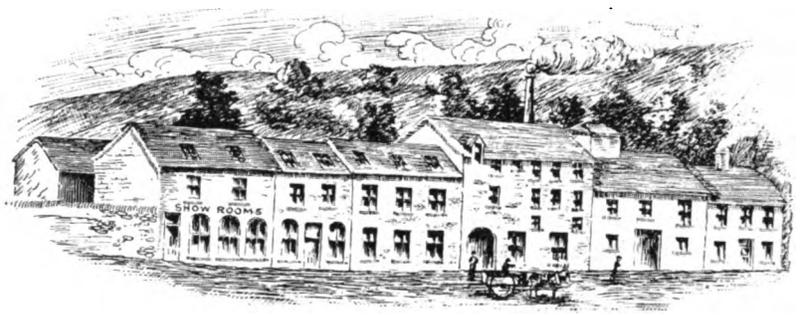


A WELL-BUILT SMITH SHOP IS AN ADVERTISEMENT IN ITSELF
AN EXTERIOR VIEW OF MR. ERIC KUEHL'S SHOP

My Own Shop Arrangements and System.

MICHAEL BREEN.
Ireland.

The accompanying plan is of Rock Factory, so-called because of its having been excavated out of the rock which partly surrounds it. The plan shows only one floor. The back part is on solid ground, and here are the yard, shed, the smithies, the machine room, the wheeler's shop, and the engine and boiler house. In the front part are the paint and varnish shop, the bodymaker's shop, the tool store and the workshop office. The private office is downstairs. On the ground floor are also the show rooms. In the loft over the workshop is the timber store and the saddlers' and trimmers' shop. Everyone who sees this place says it is designed by nature for the business. It was originally, however, a malt house. About 17 years ago I purchased it and converted it by a good many alterations into what it is at present. To explain why it is so well adapted for the business; it is built on the side of a hill, and there is almost level access to all parts of it, so that there is no hauling up or letting down of stuff. This saves a great deal of time and labor.



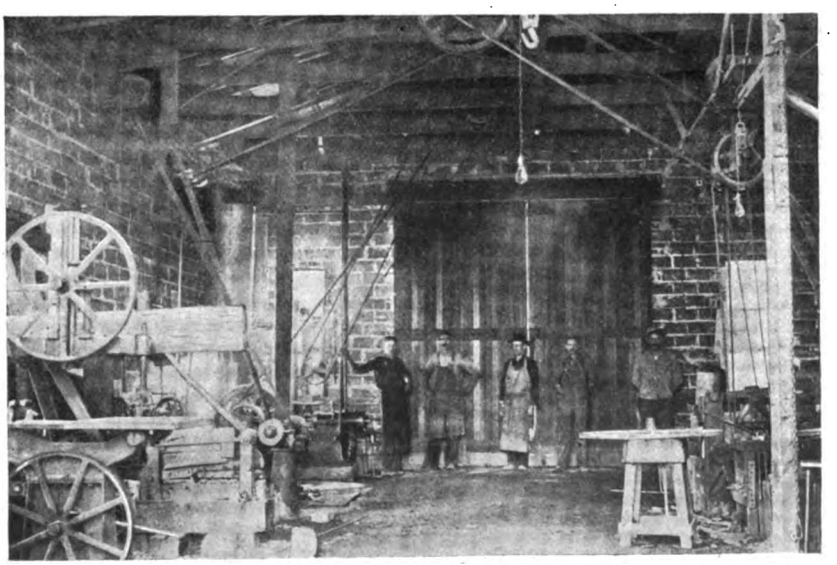
A WELL-EQUIPPED SHOP OF IRELAND KNOWN AS "ROCK FACTORY"

I am very fond of handy labor-saving devices and keep a good set of tools in every department. I make it a point to have them convenient to the work and have all my machines arranged according to their uses. I have seen many good machines lacking in utility for want of being properly placed. I operate my shop by gas power as I find it handiest and cheapest. I also have a steam engine, which I use for the steam-hammer and for bending. I scrap axles and other forgings for some particular iron that I might want. The heaviest forging I ever made was an anvil of 215 pounds. It came out a very good, sound job and, though it cracked in the hardening, it worked for years. But such work would not pay a man like me, though I have made all the tools a smith would need.

The following numbers correspond to those in the engraving and show the various machines in the shops.

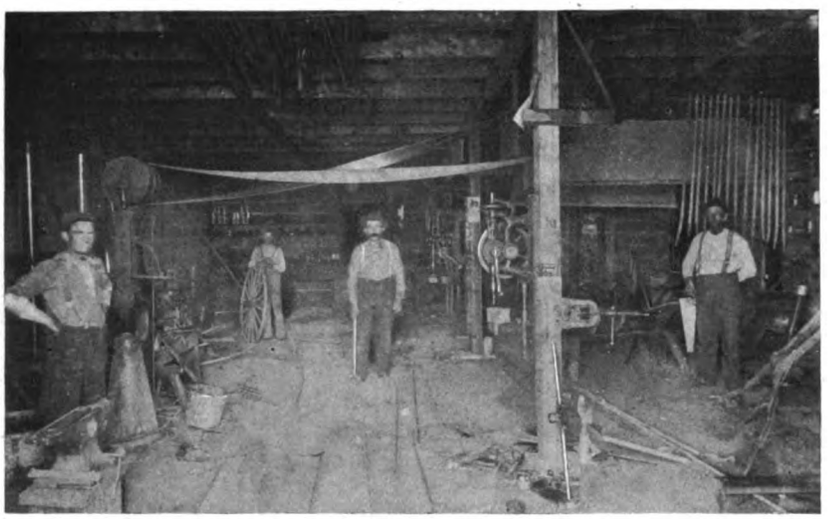
1. Paints and brushes	19. Flagstone
2. Tool store	20. Drilling machine
3. Bolt rack	21. Emery wheels
4. Band saw	22. 12-in. slide lathe
5. Screw rack	23. Punching mach.
6. Wood lathe	24. Gas engine
7. Single bench	25. Power hammer
8. Double bench	26. Fan
9. Trenching machine	27. Steam engine
10. Circular saw	28. Boiler
11. Office	29. Steam hammer
12. Iron rack	30. Scrap furnace
13. Concave platform	31. Plating furnace
14. Flat platform	32. Tool rack
15. Tire furnace	33. Coal bin
16. Coal	34. Water tank
17. Forge	35. Mortising mach.
18. Anvil	36. Tire bender

I keep a good staff at all times, according to the work to be done, and we are always kept pretty busy. I run a general repair shop as well as a carriage factory. In fact I do all kinds of work from the forging of a needle



MODERN EQUIPMENT MEANS EASIER WORK, BIGGER PROFITS AND MORE TRADE
INTERIOR OF MR. KUEHL'S SHOP

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A KANSAS SHOP BUILT OF CONCRETE BLOCKS AND OPERATED WITH GAS POWER

to repairing an anchor. I work at all the different trades or branches that I run—blacksmith, wheelsmith, engineering, fitting, plumbing, plating, brassfounding, and all branches of the timber trade, painting, trimming, etc. I could build my own shop and dwelling from bottom to top. I served my time in the blacksmith trade and worked at it the most of my life, and find the other trades only child's play compared with it. I have had apprentices to most of these trades, from time to time, and they came out good men.

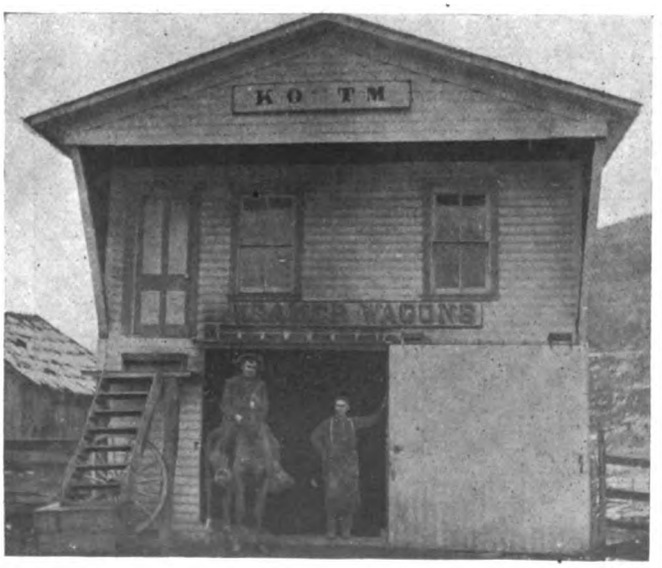
There is an unfortunate notion in this country that when a man learns a trade he must stick to it and do nothing else, no matter what his genius and taste may be. This is not a progressive system, and is ruinous to a country. It is not the system you have in America. If a man can live best by a speciality, no doubt he is bound to do it, but if he finds it otherwise, he is bound to change to something else. I always give my boys a look into everything I have to do, and let them choose for themselves. Another thing I make them do, is to keep accounts of time and stock, and help in taking stock, to keep a memorandum, and draw a plan of the work they have to do.

A Well-Equipped Shop of California.

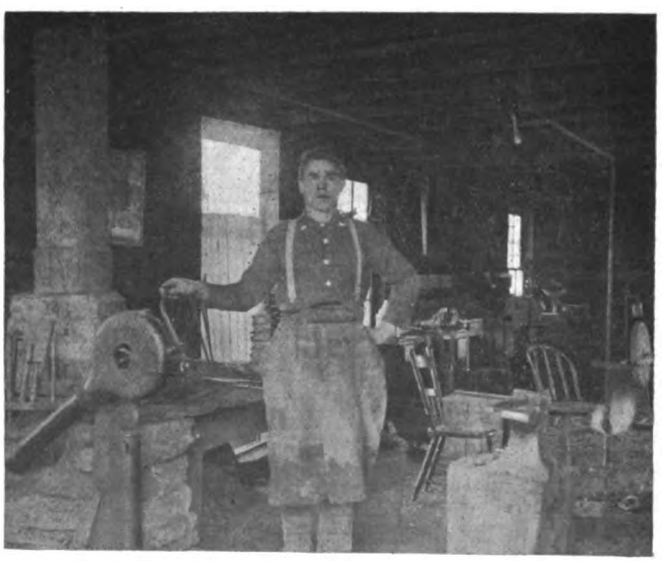
ERIC KUEHL.

I started a little over seven years ago by buying out a horseshoeing shop, a frame building 22 by 60 feet. After working in this shop five years, doing all kinds of work, my business increased so that I concluded to build a larger shop. So I bought the next lot, a corner one, and put up a 28 by 50-foot brick shop, equipping it with a three horsepower motor. I have been increasing my tools ever since the building was completed, always buying the best tools for hand or power use on the market, so that at present I think I have about all I need for the proper running of a shop in a country town of 2500 inhabitants. In the shoeing department I have a Barcus horse stocks. In the carriage shop, I have a power drill, an emery stand for two stones, a power bolt and nut-cutter, a trip-hammer, a blower, a patent gas tire-heater, a 36-inch grindstone, a tire-shrinker, a punch and shear, and last fall I bought a 26-inch bandsaw. With all this equipment I found that the electric motor was too small and expensive, so I bought a six horsepower Robertson straight line gas-engine (Robertson Mfg. Co., of Buffalo, N. Y.). I cannot praise the change from electricity to the gas-engine too much. The engine is a beauty in appearance and does the work easily, the cost being about thirty-five cents a day. If any one can suggest cheaper and better power (for the number of tools I run) I should like to hear from him. I start the engine on a pint of gasoline and then start the pump on No. 1 distillate. I would advise my brother smiths to buy an engine large enough so that every tool can be used at the same time. An emery wheel uses more power than any tool in the shop, but since installing the engine, I don't need to climb up and take off any belts in order to use the emery wheel. I have three fires connected with my blower. I use two of them steadily, and have the third fire for the summer, when work is rushed. The prices are fair and work is plentiful. I put on rubber tires as a side issue.

That power is a paying investment is self-evident. What better argument is there than the steady growth in the

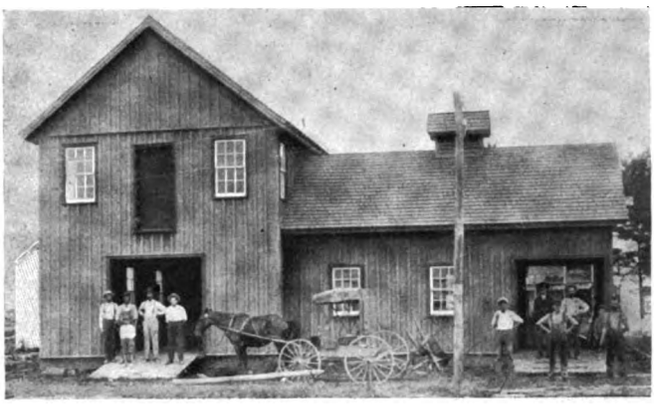


A SHOEING SHOP OF WEST VIRGINIA OWNED BY MR. M. G. TAYLOR

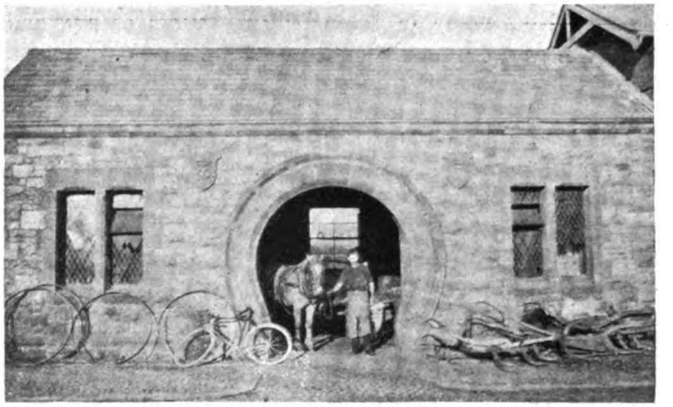


BESIDES SHOEING HORSES, MR. TAYLOR ALSO DEALS IN BUGGIES WAGONS AND HARNESS

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A NEAT SHOP OF VIRGINIA WHERE GENERAL SMITHING AND VEHICLE WORK IS DONE



A UNIQUE SHOP IN IRELAND. THE DOORWAY REPRESENTS A HUGE HORSESHOE

number of power shops, the increase in business in the individual power shop, and the necessity to enlarge the shop after power is installed? The modern shop cannot prosper and grow without power. It is as necessary as the elevators in a modern twenty-story office building.

A General Shop in Kansas.

GEO. H. WATKINS.

My shop is 30 by 40 feet in size and is built of cement block. I have also an engine room addition of 8 by 16 feet. Here I have a five-horsepower Weber gasoline engine. My equipment consists of a power hammer, a power blower, two steel vises, two drill presses, one rip saw, one Brook's cold-tire setter, one tire bender, one tire shrinker, one emery stand with two wheels, one disc sharpener, and many smaller tools. We do a general smithing business, such as wagon and wheel work, plow work, general repairing and the like.

A Neat Shop of Virginia.

R. E. FOX.

The accompanying engraving is an exterior view of my shop, which is laid out in the shape of an L. The coach department is 20 by 40 feet, with a paint shop above. The blacksmith shop is 16 by 26 feet and adjoins the carriage shop. We do a general smithing business—horseshoeing, blacksmithing, vehicle work and painting. A partial list of our prices follows:

Dump carts (for farm use)	$25.00 to $35.00
Farm wagon (single horse)	30.00
Oyster tongs (patent)	15.00
Oyster tongs (heads for ordinary tongs)	3.00
Tiring buggy wheels, per set	2.00
Tiring new light	4.00
Tiring new heavy	5.00
Axle stubs	4.50
Shoeing horse, plain	1.00
Shoeing horse heel & calk	1.40
Rimming buggy wheels (each)	1.00
Rimming cart and wagon (each)	1.50

I enjoy reading the various opinions of my brother readers and like to compare their methods. As to the Sarven wheel controversy, I always cut the rivets and have not had a single wheel returned. I cut off the rivet, take out the old spoke, fit the new one and glue it in. By using good glue, you can always repair a wheel good by cutting the rivets.

The Old, Old Subject: Apprentice Troubles.

FRANZ WENKE.

The question of "Apprenticeship" is again on top. Allow me to call your attention to one thing: We are in a very worldly period of time. When we were boys, our elders thought that hard work was our lot or, "In the sweat of thy brow shalt thou earn thy bread." This was then true as it is today; but religion of the old kind, except in a few localities, is not what it used to be. Now, in my time, when I was an apprentice, we boys were brought up in the old manner, and were subsequently God-fearing. We didn't know any better than to work hard, have our fun, go to church every Sunday morning and keep our mouths shut when the "boss" spoke. But nowadays, the boss has nothing to say, but to put up with the criticisms of his apprentices. I have ever heard about the dirty blacksmith and about the heavy work blacksmiths are doing. But, boys, let me tell you the blacksmith's trade is one of the cleanest on earth, if you are clean yourself. We are only black in face and hands, but not dirty. Hard work; yes, we do some pretty hard work, but no more than any other man who wants to succeed. If the clerk or counter-jumper does not work hard, "hold his ears stiff," I mean, pays no attention to his duties, he will never

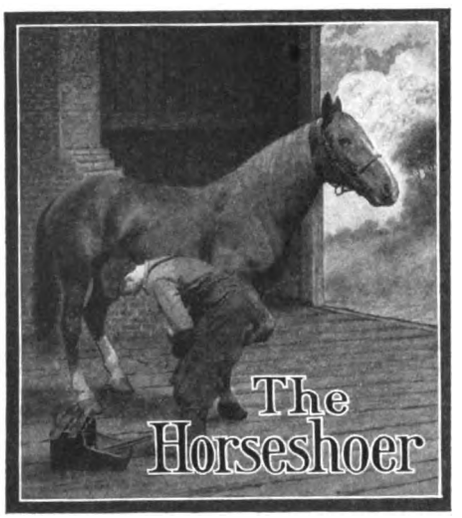


A GENERAL SHOP OF INDIANA WHOSE OWNER HAS SEEN HALF A CENTURY OF SERVICE BESIDE THE FORGE

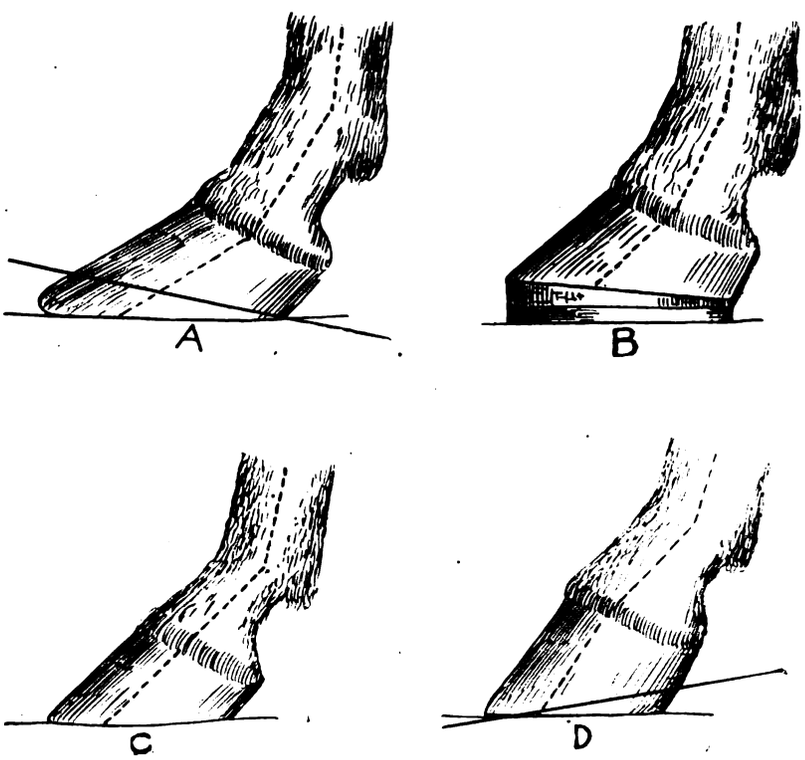
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succeed. How many of those fellows who start in earning money when they leave school have ever made a success? Practically none. Every man, doctor, teacher, or other so-called professional man, as well as the blacksmith, wheelwright and horseshoer, had to go through the mill. It took me 12 years before I was sergeant in the U. S. army. I had to learn the trade of soldier first. And so in every trade—every boy trying to embrace the trade should remember, it is only three short years of his life to make himself a useful member of our society. Have your play, for all work and no play makes Jack a dull boy, but everything with reason.

Bosses, remember how hard it was to be denied a look on the street parade when the circus came to town. Our boys are no better than we were. Give the boy a chance to have his fun, but at the same time make him understand that all play and no work makes Jack a chump. I am not a preacher nor a teacher, but unless the parents of the day teach their boys that self is the man and that the salt they earn for themselves is the sweetest, we, the blacksmiths, will have little success in getting good apprentices. The age is given too much to getting rich quick without working. But, remember, boys, a good trade like blacksmithing is a sure foundation for future life—something always to fall back upon. I am 45 years of age, and have done work for 31 years as horseshoer, general blacksmith, machinist and ship blacksmith. I have worked hard, have had my fun, am still ready for some more fun; and if God gives me 20 more years I think I will do some more.



Use a leveling plate in your shoeing department. It may be of iron or any other smooth, flat surface that will hold its face. I have seen one of marble. But as this is liable to be broken I would recommend an iron plate. Have it perfectly smooth and level. When your shoe is ready for the foot, hammer the shoe gently on the plate so as to get it perfectly level. R. B. ADAMS.



THE AXIS OF THE LONG PASTERN MUST BE THE SAME AS THAT OF THE HOOF

The frog is the best hoof spreader you can get, if you will simply let it do its work. Use a tip, a bar shoe or a half bar shoe for this purpose. The tip, of course, is simply sunk into the toe-wall and allows the frog and heels to come in direct contact with the ground. This is the ideal arrangement for spreading the foot, but cannot of course be used always. The frog will do its work of spreading quickly and well, if but given a chance. H. B. SHUBERT.

Proper and Improper Paring of the Hoof.

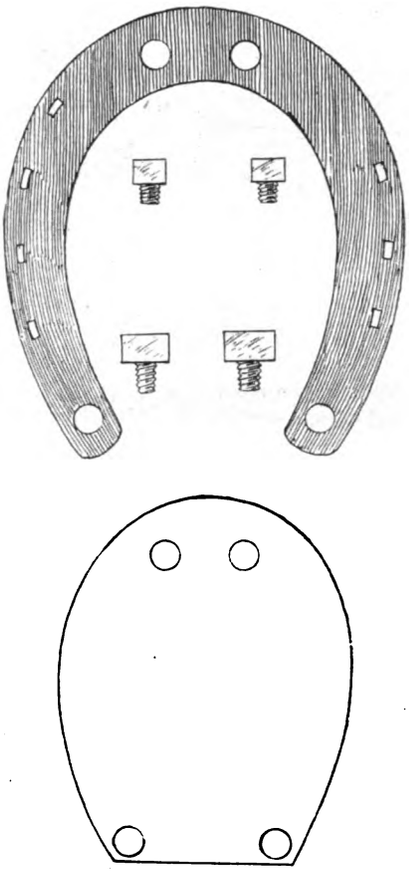
A. R. HARVEY.

So much has been said in the columns of "Our Journal" about properly paring the horse's foot that it hardly seems necessary to say anything further, but I ran across a case the other day that caused me some surprise. The animal in question had undoubtedly been wearing the shoes for some time and naturally the hoofs had grown abnormally long. The man (he wasn't a horseshoer, though he pretended to be), who undertook to trim the feet and shoe the animal, was either a new one at the trade or refused to learn any better. The engraving at A shows how the foot looked before he applied his rasp and knife. The engraving at B is how the foot looked after the shoe was applied and the hoof trimmed. The dash lines represent the axis of the foot, of which more will be said. To say that I was surprised at this method of horseshoeing is putting it very mildly. To think that a man would trim a horse's foot in that manner in these days of practical books and journals of instruction is almost beyond reason. I presume the man thought he was expending a wonderful lot of gray matter on this case. One good thing about this case was that he knew the foot should be trimmed.

All of this apropos of a talk on trimming the hoof. When an animal comes into the shop, see if the axis of the foot is what it should be. See if the long pastern has the same slant as the toe, as shown in the engraving at C. The toe may have a lesser angle or slant, as shown at A, or it may stand steeper as at D. In the case shown at A, the toe is too long, the foot axis is broken backward and the heels or quarters are too low. The remedy is shown by the solid line, which cuts off the toe sufficiently to bring the forward part of the hoof down and to throw the hoof-axis in line with the axis of the long pastern. In the case shown at D, there is an over-abundance of horn at the heels or quarters, while the toe is short. The proper method of paring is to cut down the horn as shown by the line at D. This lowers the heel and throws the axis of the foot back in line with the axis of the long pastern.

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In my opinion the shoer does not pay sufficient attention to the proper angles in shoeing a horse. An animal cannot be properly balanced if proper



THE FRONT SHOE IS FITTED WITH A PLATE FASTENED WITH CALKS

attention is not given to the foot. Some shoers base their calculations on the angle presented by the toe wall in relation to the ground. You will find, however, that the method explained in the diagrams is much easier to get correct. You need no instrument to ascertain the angle, and with a little practice and observation the shoer will make his calculations unconsciously.

Horseshoers and Horseshoers.

C. W. METCALF.

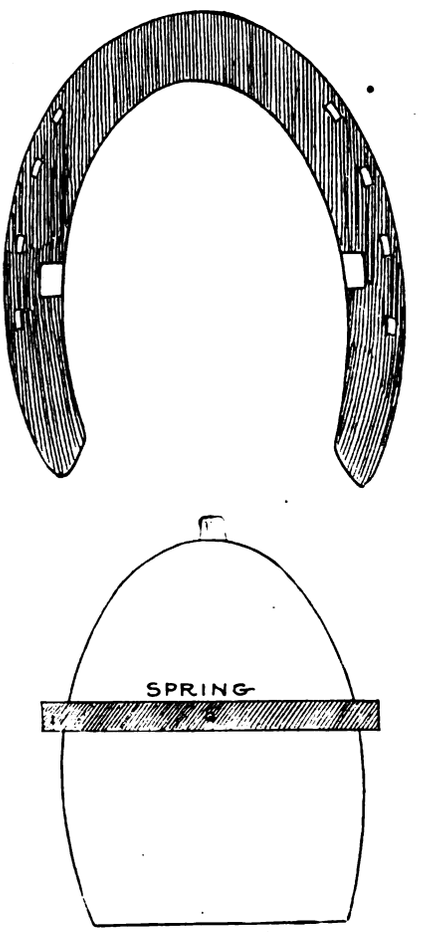
Did you ever stop to think what it means to say you or I am a horseshoer? A great many men think that they are horseshoers; but driving the shoe on does not signify in my mind that a man is a horseshoer. The way I solved this problem was to become a real horseshoer, and to learn to properly pare the foot so it is equally balanced. It is not the man who drives the most shoes in a day, nor the man who drives them so they will stay the longest, or look the neatest. It's the man that can pare and balance the foot perfectly, drive at a fair speed, and have his work look neat when finished, so the horse will travel easy and square on his shoes. If the horse's foot is affected in any way, in order to find it and to treat it, he must know the construction of the foot, the bones and tendons and the nature of all the diseases of the foot, and where the weakest part of the foot is. A poor horse is a pretty good horse if he has good feet. As the old saying is, "A good horse isn't worth much with a poor foot." A good horse has got to have a good foot and the horseshoer who can properly fit the foot and shoe so it will keep the foot in good order, is a real horseshoer.

Another Pathological Shoe.

FRANZ WENKE.*

I have read with interest, as I read everything in THE AMERICAN BLACKSMITH, the article on Pathological Shoeing by Mr. Perrin. The shoe which Mr. Perrin shows us is very good. There is a "but," however. The shoe is expensive to make, at least for the horseshoer. It is also clumsy. I will try to describe two shoes which were for the same purpose as were Mr. Perrin's. I have made several of these shoes and used them to good advantage. First, let us take the front shoe. The sole of the fore foot is, as a rule, never so concave as the hind foot; therefore I take an ordinary front shoe, fit it and bore holes as for screw calks. I then take a plate, steel preferably, of $\frac{1}{8}$-inch thickness, and cut it to cover the whole shoe up to the nail holes. Now I bore holes in the plate and fasten it with the screw calk. Or, if I wish to use a welded toe calk, I drive a $\frac{1}{2}$-inch flat punch, the thickness of the plate, half-way into the calk from behind, and leave a tongue on the plate, which fits into the slot punched in the toe calk. To dress an injured foot, I simply unscrew the calks, take off the plate, dress the foot and put the plate on again, and the horse is ready for the road.

The hind foot of a horse being always, or nearly always, more concave than the front foot, there is space enough between the foot and the inside rim of the shoe to place a thin plate between. If the injury to the foot is slight, I push the plate in after dressing the foot, and then take a strip of band-iron three-quarters of an inch wide and long enough to reach from the third inside nail-hole across the foot through to the outside nail-hole. This strip I put in diagonally between shoe and plate, and drive it as far as it will go straight across the foot. If the injury be severe, and of a nature where prolonged treatment might be necessary, I take the shoe before I fit it and make a depression on the bottom surface of the shoe, about opposite the third nail-hole, and on the inside of the shoe rim. After having the shoe fitted, I prepare the plate. In the middle of the plate I rivet a thin spring which pivots on this rivet. To put on the plate I turn the spring longitudinally to the plate and, after inserting the plate between hoof and shoe, I turn the spring across, inserting ends in the depression. This gives a permanent, easily removable, and quite good looking job, if done well. Mr. Perrin's shoes are very good, as I said before, but have the disadvantage of the bolt. This, in the first place, weakens the shoe at the heel and, should the nut get lost, the bolt will



THE PLATE FOR THE HIND SHOE IS HELD BY A SPRING AND TONGUE

slip back and the horse is liable to strike and tear himself very badly. Besides the shoe is harder to make, and does not look as nice as one without the bolt. The shoe which I illustrate is, to all appearances when the horse is in motion, just an ordinary shoe.

* Franz Wenke learned the trade of horseshoer in Germany. After finishing his apprenticeship, he studied at the Veterinary College at Dresden, Saxony. He served three years in the field artillery in Prussia and has served twelve years as horseshoer and veterinary surgeon in the United States army.

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The plate is practically invisible, while the result is the same as with the other style with its bolt and extra fixings.

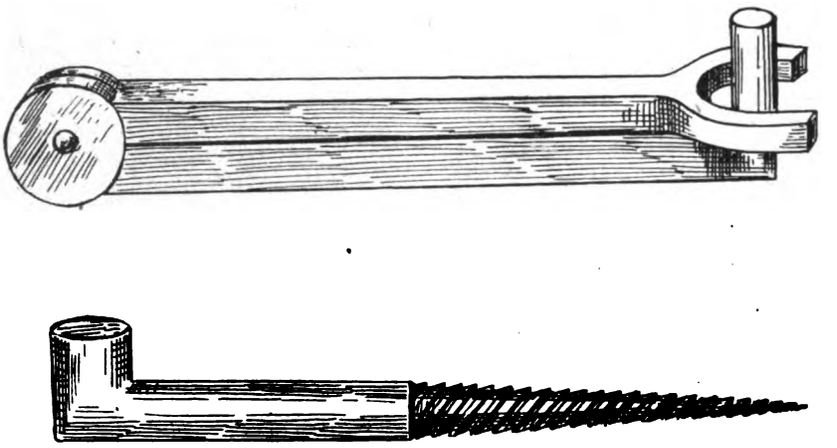
Causes, Symptoms and Treatment of Thrush.

A. F. STRACKER.

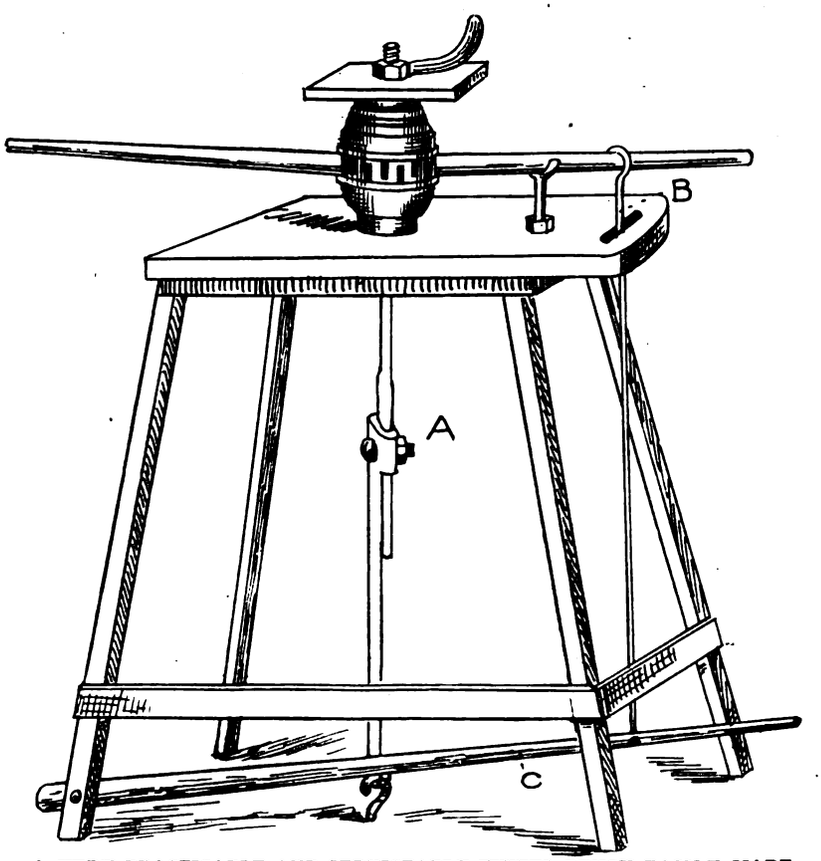
Thrush is a disease of the frog. It is distinguishable by the excessive secretion of unhealthy matter from the cleft of the frog. Primarily it is caused by filthy stable conditions, though hard work on rough, stony roads may cause the condition, as also may a change from very dry to very wet conditions. These latter causes are not, however, as frequently responsible as is the filthy stable. Wet, soggy straw or manure under the animal's feet continually is the most prolific cause.

The disease may at first show merely an increase in the moisture of the frog. This is usually accompanied by an offensive smell. After a time, however, the discharge becomes more apparent and changes from a thin, watery fluid to a thick matter, which quickly destroys the horn of the frog. The offensive odor is always very apparent, but except in old and severe cases, there is no lameness or fever. This is apparent only when the entire foot is involved.

Thrush being caused by filthy stable conditions, the first requisite toward a healthy condition is absolute cleanliness—the removal of all exciting causes. The ragged or torn portions of the frog should be removed and all diseased parts pared as far as possible. After this has been done, poultice the foot with boiled turnips, to which a few drops of carbolic acid have been added to destroy the odor. This poultice may be employed for two days, when the foot should be thoroughly cleaned. The cleft of the frog and the grooves are then well filled with dry calomel, and the foot is dressed with oakum and tightly bandaged. Should the discharge continue profusely, the bandage may be changed daily, but, if the discharge is not sufficient to discolor or saturate the outer bandage, it may be left on for two or three days. A purgative may be administered to assist recovery if there is a suspicion of any constitutional taint. This may be followed by sulphate of iron in drams doses. Should the horn seem too slow in growth, a Spanish-fly blister may be applied to the heels and is often followed by good results. Should the feet of the animal be particularly liable to the disease, the feet may be protected with leather boots. If the thrush is but a sequel or continuation of some other disease, a permanent cure may be impossible. In this case it will be necessary to observe and apply such remedies as will diminish and eradicate the exciting cause.



TWO HANDY DEVICES FOR USE IN THE GENERAL SHOP



A VERY PRACTICABLE AND SERVICEABLE WHEEL BENCH EASILY MADE

Several Don'ts for the Horseshoer.

C. W. METCALF.

Don't pare the frog.
Don't make high calks.
Don't cut down the bars.
Don't lose your temper.
Don't burn the shoe on.
Don't smoke while shoeing.
Don't imbibe in the shop.
Don't rasp under the clinches.
Don't make the shoe too short.
Don't run down your competitor.
Don't rasp or file the clinch heads.
Don't hit the horse with the hammer.
Don't load the horse down with iron.
Don't run out-doors while sweating.
Don't continually tell how smart you are.

Don't rasp on the outside of the wall more than is absolutely necessary.

Don't know it all. Always be punctual in attendance to your business. Allow your customers to know something; no man is such a great fool but that something can be learned from him. Be always polite. Keep

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posted on everything relating to your trade. Read much—drink little—take a bath once a week—dress well. This done, the craft will be elevated and the men respected.

Several Handy Devices for the Smith Shop.

J. VESTAL.

The several devices illustrated will be found very handy for the practical smith and may be made at slight cost. The wheel-bench is so well illustrated as to need little or no explanation. The rod is adjustable as shown at A. The rod which supports the spoke is also adjustable for the regulation of the dish. The rod B is fastened at the bottom end to a lever C, which is operated by the foot. This lever is hinged at the side of the bench, opposite to the operator.

The clip-tongs are fashioned from an old buggy top prop-iron. The engraving shows this tool so clearly as to make explanation unnecessary. In selecting the material for this tool, be sure to have plenty of stock on each arm of the joint.

The other tool is for pulling broken tenons out of hubs. It consists of a lag screw, the head of which is replaced by a piece of $\frac{5}{8}$-inch round stock, sufficient to make the entire tool about 18 inches long. To enable the operator to get a good hold on the tool after screwing it into the broken tenon, the handle end is bent as shown in the engraving.

I trust that these several hints may be of practical use to my brother craftsmen, and that they will respond by telling about some of their own tools and devices.

How to Temper a Cold Chisel.

LEE THOMAS.

Heat the chisel to a red, half an inch up if a small one, and an inch or more if a large one. Chill in water nearly to the upper edge of the red, taking care to leave enough heat to draw to a light blue. Also let chisel cool with as much heat in it as possible, just so there is not enough to run the temper out. You may chill the chisel in water and draw temper with two pieces of iron of a suitable size heated to a white heat, by placing the chisel between them. If the chisel is intended for cutting cold steel, it should be very thick and drawn to a straw, by following the above plan. If you leave too much heat in the chisel to draw the proper color, dip again, just enough to stop color from running after it has come to the color desired. Splendid results may be had by following the method here detailed.



"Say, Mr. Editor," exclaimed Benton, after looking over the proof sheets for the April paper, "readers should be able to get considerable help out of this paper. There are some good ideas expressed here, and he is certainly a Tom Tardy who cannot get some good shop ideas from these pages."

"Yes, a shop edition of this kind should be of much value to the boys," returned the Editor. "It'll brace them up on shop equipment and management. It will tell them what their brothers are doing in bettering conditions in the shop."

"What are some of the issues planned for the future?" asked Benton.

"Well, I prefer to surprise readers, than to have them know what to expect," returned the other, "but I don't mind telling you that power, ornamental work, advertising and business management, power hammer work and horseshoeing are some of the subjects to be treated as principal articles in the near future."

"That program certainly promises many interesting articles and will surprise many of your readers."

"Of course, this is by no means the order in which these issues will appear," said the Editor; "some of these may put in a very late appearance. You know I am always looking for suggestions from readers, and one hint or suggestion may change my entire program."

"How does the present plan of arranging the paper seem to suit our readers?" asked the other.

"Every reader seems to like it very much," replied the Editor. "I haven't received one single complaint. All readers understand that every branch of the trade will receive due consideration, as the principal feature, and covering, as we do, all branches in every issue, makes every number valuable to every reader."

Johnson came in at this point with several pieces of aluminum in his hand and asked how it could be soldered: "I've tried all kinds of schemes and solders and can't get the stuff to stick at all."

"Can't be done," exclaimed Benton. "I haven't got a receipt in all my books that'll do for soldering aluminum, and I guess I ought to have it if anyone has." And with a look of self-satisfaction, Benton leaned back in his chair to an easier position.

"Aluminum can be soldered," came from the Editor.

At this Benton sat up, open mouthed. "Better guess again," said he. "I've been collecting receipts for a good many years, but haven't yet found one that touched the soldering of aluminum," and with a know-it-all air he asked the Editor how to do it."

"Well, in the first place," returned the Editor, "when a man asks for something and you haven't it in your receipt book, don't say it can't be found anywhere. You're like old mother Thompkins, who kept a dingy little store down in my home town. When anyone asked for anything she didn't have, and this happened quite often, she'd say that it couldn't be gotten anywhere. And some things, she'd say, were never made. You see she had kept store for so long, and had kept everything way back in the early days, that she couldn't see how anybody else could have something she didn't have. But then, she was getting old—could hardly wait on the few people who continued to patronize her."

"I have heard about the soldering of aluminum," broke in Johnson, "but I haven't been able to locate the how."

"The difficulty in soldering aluminum," continued the Editor, "is the formation of an oxide on the surface of the metal when heated. This oxide prevents the solder from alloying with the aluminum. This oxidation must of course be prevented before the soldering can be done satisfactorily. It is therefore necessary to tin the aluminum with a composition of aluminum and tin. This combination is made of about five parts of tin to one part of aluminum. After tinning, clean the parts to be joined and proceed with your soldering in the ordinary way, but use a specially prepared aluminum solder. This is made by adding small pieces of aluminum to melted copper. After stirring the mixture, add zinc and a small piece of tallow. This must be used with a soldering iron of aluminum."

"That's a new one to me," put in Benton, "I will certainly add that to my collection."

"If you find that combination too complicated for you," continued the Editor, "you can make a good aluminum solder of eight parts of tin and two parts of zinc, using tallow or benzine as a flux. This can be used with a common, ordinary soldering iron and will probably be more convenient for you to use."

"Say, where did you get all those receipts?" asked Benton, as the editor closed the book from which he was reading.

"I've made a collection of my own for years," repiled the other. "I often refer to it and find my scrap-book of receipts very handy at all times."

"I never knew that," returned Benton. "You've always asked me what to do in this, that or the other case, and I always thought I was giving you information no one else could give you."

"Well, I have simply taken this chance to show you that we know a thing or two," and with a nod to Johnson, the editor turned to a pile of manuscript which the boy had just brought in.

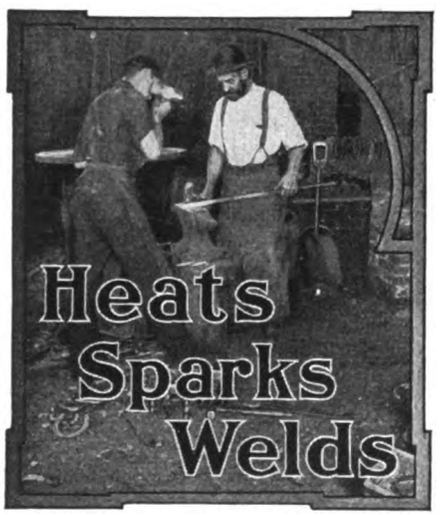
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The Horse and His Rider.

JOANNA BAILLIE.

Braced in the sinewy vigor of thy breed,
In pride of generous strength, thou stately steed;
Thy broad chest to the battle's front is given,
Thy mane fair floating to the winds of heaven;
Thy stamping hoofs the flinty pebbles break;
Graceful the rising of thine arched neck;
Thy bridle-bits white flakes of foam enlock;
From thy moved nostrils bursts the curling smoke;
Thy kindling eye-balls brave the glaring south,
And dreadful is the thunder of thy mouth:
Whilst low to earth thy curving haunches bend,
Thy sweepy tail involved in clouds of sand,
Erect in air thou rear'st thy front of pride,
And ring'st the plated harness on thy side!

But lo! what creature, goodly to the sight,
Dares thus bestride thee, chafing in thy might;
Of portly stature and determined mien,
Whose dark eye dwells beneath a brow serene,
And forward looks unmoved to scenes of death,
Who, smiling, gently strokes thee in thy wrath:?
Whose right hand doth its flashing falchion wield?
A mighty soldier girded for the field!



Care never lamed a horse.

Today is "sometime"—Do it now.

'Tis a trade winner—a neat bright shop sign.

Spring is abroad in the land—so the calendar says.

Open wide shop doors and windows these spring days.

The fault seeker, as a rule, need never leave his own forge.

Now's the time to try out your winter dreams for trade-winning.

Pure profit is every ounce of satisfaction delivered with the goods.

Detail your shop troubles to us. We can help—that's what we're here for.

Promises—live up to them and you'll soon have a reputation to be proud of.

The man who grips his tools to suit the pay, will always be paid to suit the grip.

The spoke that squeaks the most doesn't always carry the biggest part of the load.

Keep in mind and not in book, the slow pay and dead beat. Avoid last year's ruts.

Poultry farming is a York State smith's side-line. He specializes White Plymouth Rocks.

A good investment—a good turn at shop painting. A good time too—no flies or dust now.

A day or two after the insurance runs out, the fire occurs—watch the date on the policy.

Do you? Some smiths seem to think prices will raise themselves. Get the secretary's ideas.

'Tis a bad habit to drop tools where used. A place for everything and—then remember the place.

Rule of thumb never measured success for any man. If you guess about business, you guess at profits.

His friendship is better lost than your money. The former's likely worth little if he won't pay his debts.

Fight! It's the man who overcomes obstacles who reaches his goal and finds himself stronger for the struggle.

Worth more to the smith than a page of advertising is a reputation for honest work. Both together are a gold mine.

Sit right down now and write that long looked for article for publication. Of course we want it; have been looking for it.

New tools don't pay? Depends on the user—grandfather's methods and machines are for him who doesn't want to advance.

Called recently? Run over now—take "Our Journal" along. Your neighbor 'll be glad to see it. Don't forget a subscription blank.

You may be busy, but are you as busy as you might be? Several good doses of spring-trade tonic—advertising—will put new life into your trade.

If all men had taken things as they found them, we would still be wearing skins and living in caves. Have you just a little of that disposition in you?

On to fifty thousand. Have you helped by getting a new subscriber? Send a dollar—we'll enter the new name and advance your time six months.

His waking hours almost all are spent in the shop. A good, modern forge, pure clean air, plenty of light and sunshine, all are necessities. Insist upon them.

"I'm not a smith, but a printer, and I know a good paper when I see it. So let "Our Journal' come another year," says a Western reader when renewing.

Look over your accounts at regular intervals. Sometimes a customer gets so far behind, he can't catch up—then you're behind. Examine the books today.

Each active member of the good old craft is the sheriff, recorder, judge and collector of revenue of a certain Missouri county. That's a pretty good showing.

Send them on—that's all you need say, and our easy plans for organizing your county will go by return mail. Best time for this work is right now—write now.

'Tis estimated that all the money in circulation among all the nations of the world amounts to something less than $15,000,000,000. This is, of course, not the wealth of the nations.

"Never advertise your competitor by criticising him," said Thornton. "When you pay your good money to advertise your business, for your business' sake, advertise your business."

Thousands have scurried across the country, more await your call. One smith says: "They alone save many times the cost of the paper." Use them freely and say "More Pink Buffaloes," when your supply is exhausted.

"Been expectin' that every day," said Tom Tardy, as his shop sign just missed the customer's head. "The big January storm loosened it, and I thought I'd let 'er come down and then have 'er painted." He probably means next year.

Some little time can most smiths devote to a side-line—write for the agency of some standard article. We heard of a smith, the other day, who talked up a sale while blowing his fire. It meant as much honest profit as two days' hard work.

Have you read it? Look it up now. Means a square deal for the reader from the advertiser and the same for the advertiser from the reader. That Honest Dealings paragraph works both ways. The Pink Squares go with it. Plenty of them in Buffalo to be had for the asking.

A Pennsylvania Smith, with over a half-century of trade experience, who is still an active knight of the forge, says when renewing his subscription: "My wish is that THE AMERICAN BLACKSMITH may prosper beyond all expectations. It deserves the support of every smith in this broad land."

Your letter heads. Do they look as though you were Tom Tardy's grandfather, or do they tell people that you are neat, progressive, clever and successful. A business man is largely known by his printed matter, and the smith, these days, who succeeds has to be more or less of a busines man. If you have a line of broken-down stationery, give it to the baby to draw pictures on and get some that will do you justice.

Old John Hem-and-Haw is content with his grandfather's shop and his grandfather's tools. Any old prices are good enough for him. He sits around on a nail keg and never thinks of taking a craft paper. Jack Up-and-doing is ever improving his shop equipment and building up his business. He takes a good paper and has organized a county association for raising prices. That pretty house over the way he has bought and paid for, and the seat of his trousers never wears out.

Cutting iron with yarn will at first thought be treated as a rather fishy yarn, nevertheless the warden of the Federal prison at Ft. Leavenworth once found a prisoner doing this very thing. The man finally was induced to give a demonstration. A grating of the same description as that at his window was placed in his cell and a guard stationed over him to exact the proof of the statement. With the limestone dust and silicate from the stone pile, the yarn from his sock and a little water this man cut

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the Bessemer steel bar in eighteen working hours. With some fine emery, a chalk line, and two wooden handholds to save his fingers, he made the other clean cut of the bar in five hours, proving the matter to the guard's satisfaction.

American Association of Blacksmiths and Horseshoers.

The March number of our esteemed contemporary, The Blacksmith and Wheelright, contains a very strong editorial on the value of organization as a means by which to secure needed reforms for the craft; better prices and protection. Several columns were devoted to the talk and strong examples of the need of better prices illustrated. It is most gratifying to note this evident change of heart thus recently displayed by Brother Richardson in view of the same contemporary's anti-organization remarks some months ago.

The forceful work which The American Association of Blacksmiths and Horseshoers has done and is doing, has had a result which has not only shown the need for better prices, but has drawn into line the most conservative. We are glad to thus have the support of all publications in our work of furthering craft interests, and we are sure that our efforts will result in a great, strong national American association. This has ever been our plan, and the success which has attended our efforts thus far indicates, as nothing else can, that it will be an association reaching its arms of aid from Maine to California—an association having one great common object; that of furthering the interests of the smithing craft and securing for its members needed protection and reforms.

Keep up the good work, Brother Richardson.

The coming of spring finds the American Association of Blacksmiths and Horseshoers bigger and stronger than ever. Quite a number of new branches have been formed, old ones have strengthened and any number of counties are in process of formation. The letter from a Missouri county association explains itself. It shows the wonderful support which has been accorded the association movement in that state. A Kentucky county branch called their first meeting just 15 days after the receipt of their request for plans. Another Southern county branch has met with such success that, with but very few exceptions, every blacksmith is a member.

But this success in other states is not starting the movement in your county, brother. What I want you to do is to send for the easy plans for forming county branches. You know my address—P. O. Box 974, Buffalo, N. Y. Send today before you forget it. Just before the spring rush, is the most opportune time of the season for joining forces, raising prices and establishing those reforms which are needed in the smithing craft. Don't let another day go by without making some effort to better the condition of the craft in your county. If you will but confer with your brother smiths, you will find them just as anxious as you are to better craft conditions in your county. All you need is co-operation. Get my easy plans for the forming of branch associations, and secure for yourself and your family the needed protection to which you are entitled.

Reading my letter every month in these columns will not do the work, Mr. Reader. Action is required—good prompt action. Suppose you sit right down and ask for my easy plans. 'Twill take you but a moment; 'twill cost you but a cent. Do it right now—write now.

THE SECRETARY.

An Association Letter from Missouri.

As it is just a little over one year since the first county in Missouri formed a blacksmith association, I thought I would send in a few items of interest for the benefit of the craft. This county is organized solid with but few exceptions. The few smiths who haven't joined will soon fall in line. There is no question but what every blacksmith will have to admit he is greatly benefited by the association, as prices have been advanced from 15 to 40%. With the increased cost on material, prices had to be advanced, and there was no way to advance prices to a living profit but through organization. Linn county organized in January. They started with a membership of about 30 members and have good prospects of getting every blacksmith in before the association is six months old. Carroll and Caldwell counties will have their first meeting in the near future and organize as a county association. It is necessary that every county join the blacksmith's association, as it is the only way to eliminate trade evils. The association creates good-fellowship and fosters that friendly feeling that blacksmiths should have towards each other. Without the association, you know nothing about your competitor, except what your patrons tell you, and that kind of information usually misses the truth about 99%. It has been a great practice for customers to come to the shop and raise Cain about your neighbor blacksmith, in order to work you for a cheaper job and then get work on time and beat you out of your pay. The association stops all of these schemes and sleight of hand performances.

ALBERT SCHUETZ.

P. S.—I also send our agreed prices for all smithing work.

Plow Work.

12-in. slip share put on	$3.00
14-in. " " " "	3.50
16 in. " " " "	4.00
18-in. " " " "	4.50
6-7-8-in. " " " "	2.00
12-in. plow sharpened	.20
14-in. " "	.25
16-in. " "	.30
18-in. " "	.35
Plows sharpened on stock, extra	.05
Standing coulter sharpened double ends	.20
Pointing plow shares	.75
Patching mould boards	1.00
Setting plow beam	.75
Welding heel on bar	.50
1 horse plow beam	1.50
2 horse plow beam	1.75
3 horse plow beam	2.00
1 plow handle put in	.50
1 plow handle round	.15

Iron Wagon Work.

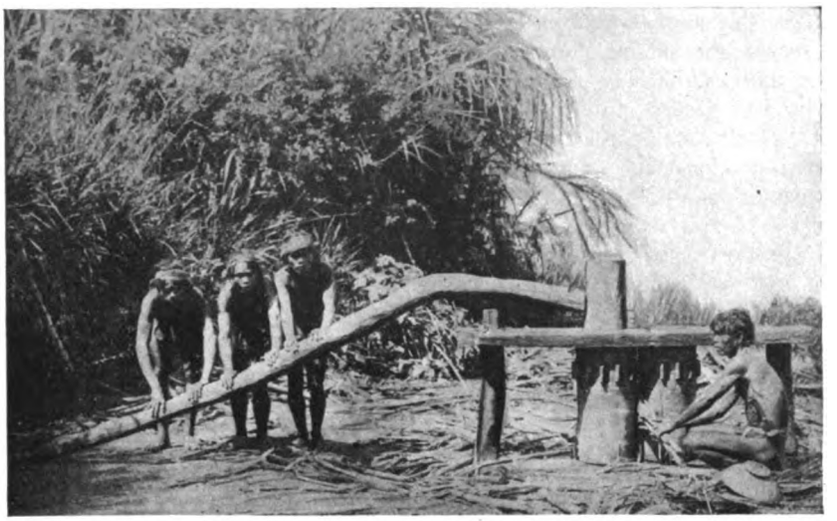
4 tires set	$2.00
4 log wagon tires set	3.00
four 3¼ x 10-in. new skeins with boxing put in	8.00
1 new skein only put in	1.50
1 new skein boxing only put in	.75
four 3¼ x 10-in. steel skeins extra	2.00
1 new tongue cap put on	.50
1 new seat spring put on	.75
1 new set bolster plates put on	2.00
1 new sand board plate put on	1.25
1 new bolster plate	.75
1 new king bolt	.50
1 new wagon wrench	.35
1 new circle post	.25
1 new wagon box strap put on	.25
1 new hind hound plate	1.00
1 new brake shoe put on	.35
1 new rub iron put on	.50
1 Giesler brake ratchet put on	1.25
1 new tongue rod	.40

Wagon Wood Work.

Axles	$2.50
Axles over 3½	3.00
Hind bolster	1.75
Front bolster	1.50
Sand bolster	1.50

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Standards ..... $ .25
Wagon doubletree ..... .75
Brake blocks, each ..... .25
Wagon beds, wood only 11.00
Wagon beds complete and ironed.. 14.00
Wagon bottom with new cross-bar 3.50
Wagon bottom with old cross-bar. 2.50



WHO SAID THE BLACKSMITH WORKED HARD? A PRIMITIVE SUGAR-CANE MILL OPERATED BY IGORROTES IN THE INTERIOR OF THE ISLAND OF LUZON

1 bottom side in bed, old iron.... 2.50
1 top side in bed, old iron 1.50
Patent end gate 1.50
Plain end gate ..... .75
Wagon tongue, complete 5.00
Wagon tongue, wood only 3.50
Wagon tongue, pole only 2.00
Wagon tongue hounds, each..... .75
1 hind hound ..... .75
1 straight front hound ..... .75
1 circle hound 3.00
Wagon singletree ..... .50
Wagon neckyoke, old iron ..... .65
Coupling pole 1.00
Brake-beam 1.00
Top brake-beam ..... .50
1 set wagon wheels 3¼ x 10 in. with 1½ in. felloe 20.00
Respoking wheels, spokes each ... .20
Rimming wheels, felloes each .. .25
1 new hub, old irons 2.00
1 to 3 spokes, each ..... .25
1 to 3 felloes, each ..... .30

Tire setting extra.

Wagon spring seat, wood only ... 1.50
Wagon seat spring blocks extra, each ..... .20

Cultivator Work.

Pointing cultivator shovels, each. $ .50
Sharpening " " " . . 10
Setting cultivator beams, each .. .50
New cultivator tongue 2.00
New cultivator singletree, wood.. .35
New cultivator evener ..... .50
New cultivator handle ..... .40

Buggy Iron Work.

4 buggy tires set hot $2.50
4 buggy tires set cold $2.00
1 buggy tongue brace welded .... .35
1 buggy hammer strap ..... .50
1 buggy shaft iron welded ..... .50
1 buggy shaft eye ..... .65
1 buggy singletree clevis ..... .25
1 " " " bolt.. .10
1 buggy singletree ferrules, each.. .10
1 " " cockeye, each. .10
1 buggy tongue T iron weld ..... .50
1 buggy body loof-weld ..... .50
1 buggy clip king bolt 1.00
1 buggy shaft joint ..... .75
1 buggy bow socket ..... .75
1 buggy reach iron, weld on old reach ..... .50
1 buggy axle set 1.00
1 new stub-axle 2.50
1 set new stub axle ⅞ to 1 in.... 8.00
1 " " " " 1⅛ to 1¼....10.00
1 " " " " 1⅜ to 1½....12.00
1 spring leaf welded ..... .75
1 new whip socket put on ..... .50
1 new top post put on ..... .75
1 new top post nut put on ..... .15
1 new bow-rivet ..... .10
1 new buggy-spring..... 2.50
1 " " " clip put on.. .35
1 new buggy axle-clip put on .... .25
1 new buggy shackle-clip put on .. .65

Horseshoeing.

4 new toed shoes $1.50
4 shoes set toed 1.00
4 shoes set ..... .80
4 new plain shoes 1.25
2 " " " ..... .65
2 new toe-weight shoes ..... .75
2 new side-weight shoes ..... .75
4 new shoes on stallion making season 3.00
4 shoes set on stallion 2.00
2 new bar shoes 1.50
2 new bar shoes, toed and heel calks 2.00
2 shoes with rubber pad $3.00
Horses feet trimmed ..... .10

Buggy Work.

Respoking buggy wheel $2.50
1 to 3 spokes each ..... .25
½ rim ..... .75
Boxing tightened ..... .25
1 new boxing put in ..... .75

Tire setting extra

1 buggy tongue, pole only, iron.. 2.50
1 buggy tongue circle, old irons .. 1.00
1 buggy shaft beam, old irons ... 1.50
1 buggy shaft cross-bar, old irons .75
1 buggy singletree with old irons . .35
1 buggy singletree with new iron . .50
1 buggy axle bed, old irons 1.25
1 buggy head block, old irons 1.00
1 buggy spring bar, old irons 1.00
1 buggy reach put in, old irons .. 1.00
1 buggy doubletree, old irons .... .75
1 side in body, old irons 3.50

Repairing Buggy Seat.

1 new side in seat ..... $.75
1 new back in seat 1.25
1 new piece in seat, frame each .. .75

Miscellaneous.

Road grader sharpened $3.00
Stalk cutter knives sharpened, each .25
Drill points sharpened, each ..... .10
Rolling coulder sharpened ..... .40
Disc harrow sharpened, each blade .25
Harrow teeth sharpened ..... .01
Harrow teeth sharpened, taken out and put in ..... .03
Churn-drill sharpened, 2 ends .... .30
Stone-hammer sharpened, 1 end .. .15
Pick sharpened, 1 end ..... .10
Pick sharpened, 2 ends ..... .15
1 new tripod 1.50
1 spoke in iron wheel ..... .40
Welding pitman rod ..... .50
Welding sickle ..... .75

Thornton's Letters.—6.

Being "Straight-from-the-shoulder" Talk from a Prosperous Self-made Smith to his Former Apprentice now in Business.

DEAR JIM:

No, my son, you have got to puzzle out your own problems on help. I have given you several pointers along this line for just such occasions as you describe. Study the situation carefully. If good men don't stay with you, there is something the matter with you, your shop or your system. Some chaps have what the Germans call "wanderlust." If you don't know what this means, ask one of your German friends. It isn't likely, however, that a succession of six or seven smiths should have it, although the germ of this disease seems to have a special liking for young smiths.

The best way to get at the bottom of your troubles is to put yourself in

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the other fellow's place, look at yourself and work for yourself as though you were the helper. Step into the other chap's shoes—if they pinch ever so little, it's a pretty good sign that they touch the other fellow on several pet corns. You've probably been living and working too close to yourself. Just stand off a foot or two and look at yourself as others do.

Now, I don't mean to say, Jim, that it's all your fault. I'm just pointing out these little things for your good. I know the trouble, but I want you to find it. All I'm going to do is to give you a hint. Here it is, see if you can catch it—"You carry home more soot than anyone else in the shop." If I'm correct in my guess, just sit down and figure it out.

Now, on the question of helpers, or assistants, as I like to call them, I put them in two classes—the ones that end right and the fellows that end wrong. It's a mighty poor man that doesn't start in right. Even the chaps that end wrong begin right. But, then, there is a subdivision who are simply perfect—for the first week. They are models—can't work hard enough—seem to have heartache every time they see you pick up your hammer. Well, just about the time you think of taking him in as a partner and marrying him to your wife's sister, you find that his ambition for work has taken a big slump, and that it's all you can do to keep from kicking him out of the shop for his impudence and independence.

The chap who ends right is the fellow you are looking for. He may not be perfect when you get him—may probably need jogging up now and then on one thing or another. But you can tell if he's worth the trouble of putting on the right track. Two of the men who were in the shop while you were here were this kind—I won't mention any names, but both of them had trouble. I handed them some pretty hot talk, and a good many times was on the verge of firing them bodily, but they're two as good smiths as can be found in any shop today.

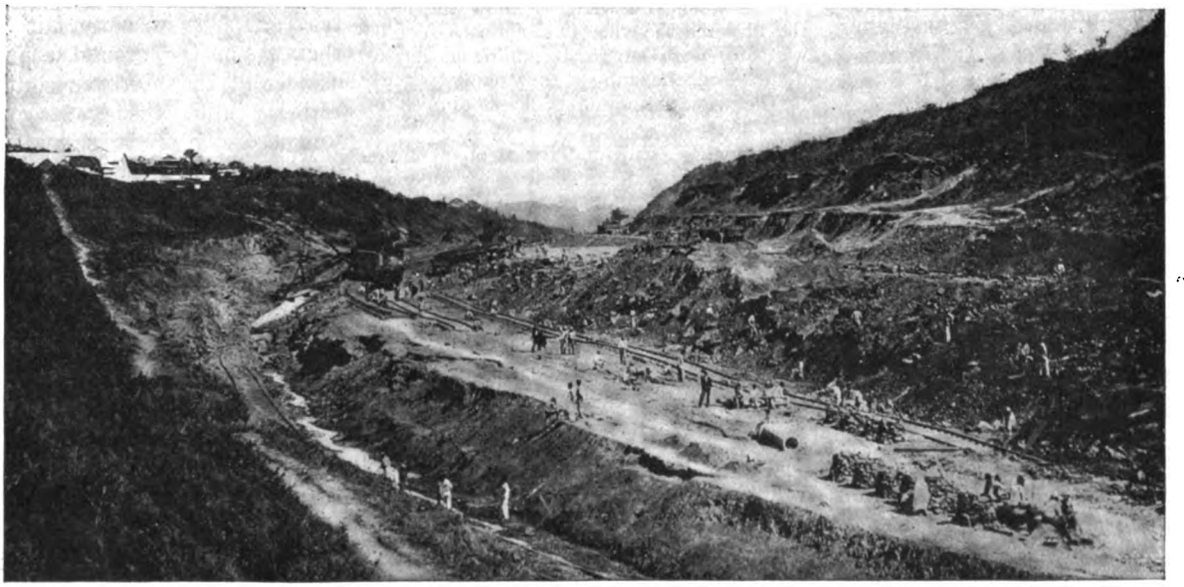
Get to the bottom of the difficulties, old man. You've got to do it. They have an unfavorable bearing on your success in business. It's far easier to keep a horse in good condition than to strengthen him after he has lost his health, and the same applies to business, Jim. Another thing; while I don't encourage direct imitation, watch the big concerns and see how they do business. You can apply their principles in part if not wholly.

Let me know how you solved this little puzzle on helpers. I am pretty sure that I have measured your case correctly. You know you were here for several years, and it is a pretty slow employer who does not know his help. Don't let these little things, nor the big ones, either, trouble you, for they may get the best of you. Make up your mind to get a strangle hold on your difficulties and you'll be surprised how easy the sledding is.

I'm glad to know that collections are good. Best to keep after accounts all the time. Don't go at them hit or miss fashion or only when you need money. Keep pounding away at your debtors all the time and you'll have money all the time. Remember, Jim, easy lies the head that has no debtors. and it's usually the same head that discounts its bills—a great factor in these days of close competition and narrow margins. You've got to keep your eyes on these things, Jim.

Yours,

Thornton



A GENERAL VIEW OF SOME OF THE WORK BEING DONE AT PANAMA. THIS PICTURE GIVES AN IDEA OF THE ENORMOUS AMOUNT OF WORK NECESSARY TO DIG THE DITCH ACROSS THE ISTHMUS OF PANAMA

The Smith in Mythology.

Myth history contains many stories and fables of the smith, his art, his great power and his control of the elements. Many tales of the smithing gods have been handed across the centuries by the ancients. These tales, while much the same in general as regards the respective gods, differ somewhat in detail. For instance, the Greek god, Hephaestus, while answering to the Roman Vulcan, is described as being lame from birth. 'Tis hardly possible to connect this same physical deformity with the great Vulcan. Both these figures are, however, fabled to have occupied burning mountains as their work shops, and to have employed the Cyclopes, a race of one-eyed giants, as their apprentices. Vulcan as the Roman fire-god married Majesta, while Hephaestus is supposed to have married Charis. Both these gods are, however, fabled to have been confined in the center of the earth by Kronus, who found them dangerous to his rule. But in the war with the Titans, they were set free to supply the thunder and lightning to Zeus. There is a similar legend regarding Thor, the Scandinavian god. He is fabled to ride in a chariot, the

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wheels of which sent thunder rolling through the clouds. His hammer is said to have produced the lightning flashes. This story regarding the origin of lightning is common in the mythology of many countries.

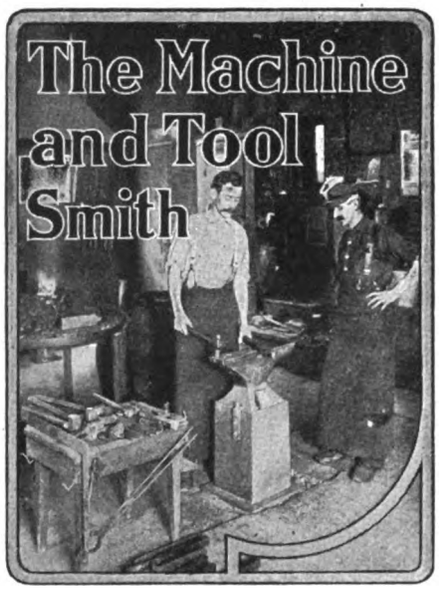
With Thor, the Scandinavians also seem to associate a Völund, who appears more properly to be the Teutonic god of smithing. Völund is said to have forged that famous sword, Balmung for Siegfried, with which the latter slew the dragon. Völund also seems to have been confined in his forge by the king, who cut the sinews of his feet to prevent his escape.

The Cyclopes, the fabled apprentices of Hephaestus, were a race of giants having but one eye, and that in the middle of their forehead. Their names were Brontes, Steropes and Arges. They lived in Sicily and assisted in the workshop of Hephaestus under Mt. Etna, a burning volcano on the island of Sicily.

A story connected with Hephaestus is told that anyone who put a lump of iron in a certain spot at night found next morning the article he wished, ready made. This fable in English legend has a mysterious farrier as the principal figure. He is known as Wayland, a supernatural and invisible smith. He is introduced by Sir Walter Scott into his novel of "Kenilworth." Wayland Smith's cave is still pointed out to the visitor to the Vale of White Horse in Berkshire. The legend says that if a traveler would tie his horse nearby, leave sixpence for a fee and retire from sight, he would find his horse shod on his return. Wayland, or Wieland, as he is sometimes referred to, is identical with the Scandinavian Völund.

Still another god of smithing is found in Finnish mythology. He is known as Ilmarine, and tales much like those woven about his brothers of other countries, are told concerning him.

Perhaps the most wonderful acts of smithing and forging are attributed to the Greek Hephaestus. He is said to have forged a new sun every morning, and naturally is supposed to have married dawn, as Wieland marries the swan maiden. All wonderful works were attributed to this divine smith. The house of the gods in particular was made by Ilmarine and by Hephaestus, and they too, like Wieland, made metal figures that moved and almost equalled living beings. In general, the art of working metals by the hammer is under the patronage of Hephaestus. This, many consider, points to the art as one of the very oldest known. This god was usually described as a bearded man of gigantic stature and strength, and clad in a short tunic, carrying the traditional hammer.



If you are a steel worker, be a steel worker. If you were going to write an essay on horses, you'd learn all about horses first, wouldn't you? You want to know the how, the why and the wherefore of everything the horse does. Just so with steel. If you are going to manipulate steel, you want to know the how the why and the wherefore of steel. You'll want to begin at the beginning so as to understand the subject thoroughly. And, by the way, the same principle applies to all things. J. B. W.

A welding compound for steel is made as follows: two ounces of copperas; six ounces of common salt; and one ounce each of prussiate of potash, black oxide of manganese and saltpeter. These are, of course, all pulverized and thoroughly mixed. Then mix with about three pounds of good welding sand and use as borax. This mixture will aid in the welding of tool steel and will enable the metal to be joined at a lower temperature than by borax. A. M. BROOKS.

Forging and Repairing Anchors.

C. H. RICHARDSON.

The anchor is an implement of first importance in navigation and one upon which too much attention cannot be bestowed in manufacture and construction. The invention of so necessary an instrument is to be traced, as may be supposed, to the earliest antiquity. The most ancient anchors consisted of baskets filled with stones, bags filled with sand and wood loaded with lead. Later, iron was introduced and was soon followed by the grand improvement of forming them with the fluke ends or spades. The Tuscans are credited with the invention of the fluke points. The anchor used previous to the commencement of the past century was what was termed the old-plan, long-shanked anchor. To Mr. Pering (a clerk of the Plymouth yard) most credit is due for our modern style, solid palm fluke anchor. It was he who rejected the curving of the crown and arms. He also altered the sectional form of the old rectangular to the oval shape, proving that elliptical forms are less likely to chafe the running gear, as well as bring a much stiffer tip than the fore-mentioned. Since 1820 about 130 patents have been taken for anchors.

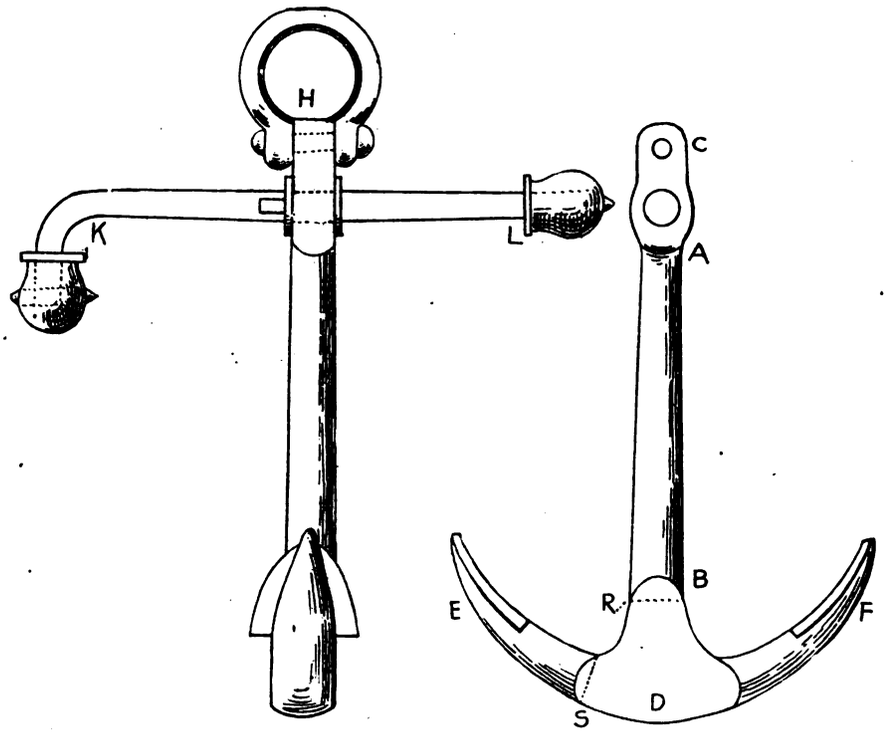
The accompanying engravings illustrate a plan adopted in most anchor works, and has proven successful in the manufacture of light and heavy anchor forgings. Fig. 1 shows two views of the common anchor. The various parts are known by the following terms: The shank is the straight part, A B; the part A C, is the stock and shackle end; D, is the crown; D E and D F are the arms with the palms or flukes; the bill and point are the extreme ends of the arms beyond the flukes. The shackle to which the cable is attached, is shown at H; K L is the stock; this is placed at right angles to the plane of the arms or shank. The use of the stock is to "cant" the anchor. If it falls with the arms on the ground, a pull on the cable will turn it over so the stock will lay upon the ground, with the weight of the crown and arms resting on one of the points. This will cause the point to enter the soil and take a fast hold.

The shanks are usually forged first, the holes punched and pinned out, leaving them small enough to bore to size of the stock. The arms are next forged as shown at E, the flukes being made solid. The bill or point is usually left long enough so it can be used for a tong-hold while the arm is being scarfed and welded into place. The various parts are now ready for welding. Separate heats are taken on the three pieces, and the whole mass is welded together. The thin scarfs are worked flush with a thin strip of steel about 1½ by ¼-inch. The surplus metal is cut off with suitable gouges and hacked in the same heat. Wash heats are now taken on the flats of the crown and fillets.

It can readily be seen that if only one arm is put on at a time, suitable counterbalance must be added, so as to be able to turn the forging while arranging for the next weld. Again, when the second arm is set in place

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and it is desired to turn the work over so as to get at the bottom laps, the counterbalance will be too great and must be removed before the work can



OVER MUCH ATTENTION CANNOT BE PAID TO THE CONSTRUCTION OF AN ANCHOR

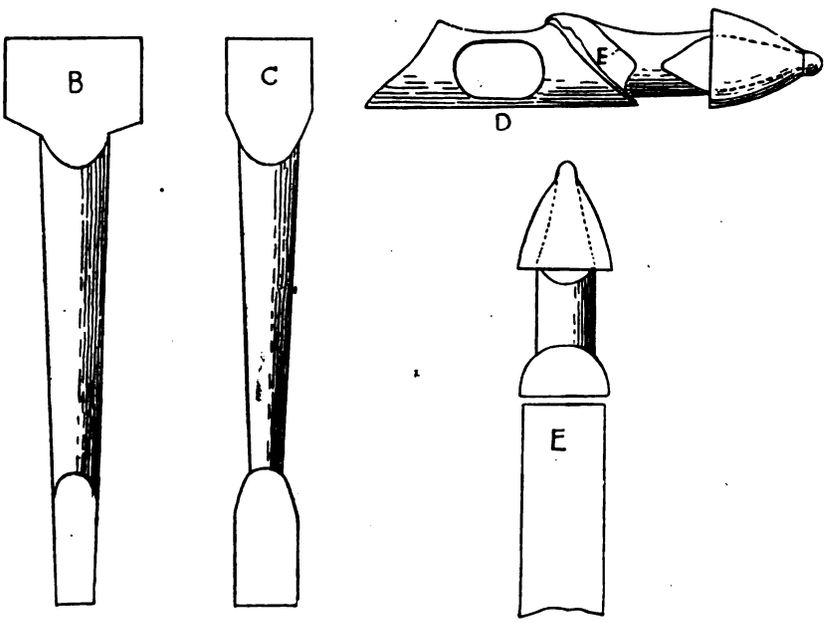
be leveled on the hammer die. So it is best at all times to weld the two arms in place at once.

The crown being finished, the arms should now be bent. This is usually done by taking local heats and with a turn-bucket fastened to the tong-hold on the point and on a half band arranged to move up and down the shank. One arm at a time is pulled in place. The radius of the arms should be equal to five-eighths of the length of the shank. The tong-hold should now be cut off and the points or bills finished.

The bend in the stock, shown at K, is to facilitate storing. When the key is out, the collar shoves back and allows the stock to move through the shank. The stock will then lay flat on the shank of the anchor and can be stored in a much smaller place.

Messrs. Brewley and Stocker inquired through the September issue of "Our Journal" for a plan to weld anchors at R and S, Fig. 1. Anchors do not break at R, as this is one of the strongest points of the anchor and least liable to strain. You may then ask why are the largest fillets and heavy crown added, if not to strengthen the anchor at this place. This surplus stock is to give weight and to cause the points and flukes to bury readily. Taking for granted that the broken anchor was used at sea, the two separate brakes which were not attached to the cable would be missing. In the case of the fracture at R, I would build the shank to the desired length, then forge the arms and place as the foregoing article explains. In case of the brake at S, build on a good scarf and add the necessary counterbalance to make the work handle easily. I would now weld on the arm.

The foregoing is the method generally adopted in constructing both light and heavy anchor forgings and will, I believe, prove successful if the reader will follow instructions carefully.



TOO MUCH DEPENDS UPON THE ANCHOR IN TIME OF NEED TO ENCOURAGE CARELESS WORK

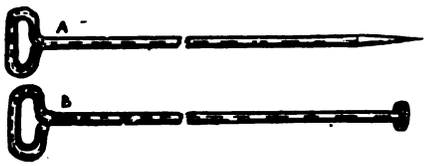
Decadence of Blacksmithing in New York City.

JOSEPH EBERLEE.

It is real pleasant and inspiring to look over the pages of THE AMERICAN BLACKSMITH, when it puts in its cheery appearance each month, and to note the increase in business all over our wide domain as shown by the many interesting letters spread on its pages. Apparently there is but one town in which blacksmithing does not increase with the growth of the population, but in fact decreases. It is not because of want of prosperity, but because of too much of that healthy business condiment. The old original town of New York in 1850 and up to 1865 had its river or waterfronts well lined with a forest of shipping. South and West streets and the nearby parallel streets were well furnished with smithshops, machine shops and other shops of like kind. There were also many big iron works such as The Novelty, The Morgan Works, The Allaire Works, Pease and Murphy Shops, Delamotor Iron Works and others. The first mentioned employed nearly 5,000 men, while the smaller works with the ship-smiths shops employed 3,000 more. Every block along South street from Jackson to Old Slip had its shipsmith shop. And the same could be said of West street from Albany north to West Houston. The horseshoeing shops and wagon shops were spread all over town. During this period wagons of all kinds

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for use in New York were made right here at home. Before the change began one could count in one slip or basin twenty or more sailing vessels. But the steamer kept pushing the sailers



TAPPING AND STOPPING MUST BE DONE CAREFULLY

out and crowded out the shipsmith and his associates. The trolley car and later, the auto-car, while they did not reduce the horseshoeing handicraft, they have about kept it at a standstill.

All these things have had their effect on the land or real estate on which the old shops stood. A piece of property which in 1860 could have been had for $4,000 in 1890 sold for $17,000. There are many places above 34th street on and near Broadway, which could have been had in 1870 for less than $10,000 per lot of 25 by 100 feet, which have been sold for over $100,000. In 1860 there were many fine carriage shops in New York, but today the fingers on one hand will more than tell them all. It does not pay to build carts, wagons, buggies, iron railings, etc., on property costing all the way from $100 up to $500 per square foot. The conditions explained in the foregoing are mainly due to prosperity.

Operating a Simple Cupola.

R. H. SOMERS.

As stated in the December paper of this series, the ratio of fuel and metal in charging the cupola or furnace is one of fuel to seven of metal. It is, however, not well to stint on the fuel. But, under ordinary conditions, the above ratio will be found sufficient. This ratio is, of course, figured by weight.

Whether or not a cupola is being handled correctly and to best advantage, will be shown by the condition of the melted metal and the time required to melt it. Should the iron show dull at the end of a charge, it is evident that the charge is too heavy. Should the iron come hot and increase in speed at the end, the charge of fuel has been too heavy or the ore charge was too light. By carefully weighing the charges each time, it is easy to determine just the correct amount and to continue it in succeeding charges.

The operation of tapping a cupola or furnace requires care and extreme caution. The operator has no time for anything but the business in hand, and unless he pays strict attention to his work, he is liable to be severely burned. The tool for tapping, A, as mentioned in the previous installment of these articles, is much like a long poker. It is conveniently made of ¾-inch, round stock, pointed at one end, a handle at the other end, and about four or five feet in length. 'Tis well to have a number of these rods on hand to guard against an emergency, such as the burning of the point of the rod.

In tapping pick out the stopping plug by digging carefully around the edge of the tap-hole. This will gradually loosen the center of the plug until the metal back of it bursts it outward and



A VERY ATTRACTIVE SIGN CAN BE MADE ENTIRELY OF IRON

flows into the spout freely. It is almost unnecessary to warn the cupola operator to cool his tapping-tool in water after plunging it into the tap-hole. This will prolong the life of the tools and prevent their burning.

For stopping the flow of metal, a "bod" stick, B, is used. This is a rod very similar to the tapping-bar, except that the end bears a disk instead of being pointed. When desiring to stop the cupola, the disk-end of the rod is pushed slantingly across and into the tap-hole. Never attempt to push the stopping rod directly against the stream of metal. It is of course understood that a lump of clay is affixed on the end of the rod before attempting to stop the cupola. After stopping, this clay is lightly tamped to make it stick in the tap-hole. The clay used for stopping should be as dry as possible and fairly stiff, so as to stand up well in the tap hole.

If any readers are in doubt regarding any branch of cupola operation, charging, tapping or stopping, their questions will be gladly answered through the columns of this paper. Questions on moulding and general foundry practice will also be answered for those interested in this branch of metal working. Readers desiring information on any specific points should send in requests for information.

A Shop Sign, An Axle Set and An Axle Gauge.

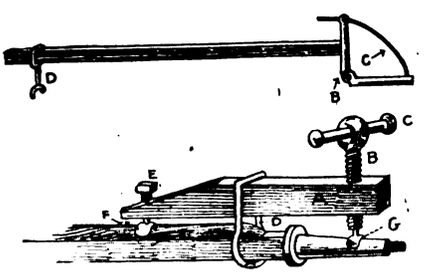
B. A. STEINKE.

The accompanying engravings show an example of my work and a couple of tools that I find very handy.

The first engraving is a shop sign I made. It consists of a big bar shoe, made of 1½ by ⅛-inch band iron. On the bar of it I placed an anvil, and on top of that is a steel beam plow made of ⅛-inch steel. Above the plow is a wheel of 3/16-inch round iron. Beneath the shoe I hung a frame made of wagon box strap iron, and in this I placed my name, made of ¼-inch rod-iron. I painted the name canary yellow; frame of it black; the shoe and anvil black; the lower part of the plow green; the handle and beam red, and the wheel yellow. I think it makes a very beautiful and attractive sign.

The axle set at A consists of a piece of iron nine or 10 inches long and one by two inches at one end, tapering down to 1¼ inches at the other end. The largest end has one-inch thread cut into it where B, a screw of one-inch tool steel, goes into it. This screw has a hole bored into it on the bottom to take in the piece G, which has to be loose and work as a swivel. The small end of A has a small ⅝-inch set screw. The celvis D is of ⅞ or 1-inch square. It is made so as to fit over A and to slide over the collar on the axle. A plate of 3/16 by 3-inch stock is bent round to go over axle stock to keep set screw from marring it.

The other engraving is of an axle gauge. It is made of toe-calk steel, full length of axle. A piece of buggy top brace, B, is taken right at joint. On one end of this a 5/16-inch rod is welded, and then bent in a perfect arc to go through



TWO HAND TOOLS EASILY MADE IN THE SHOP

the eye in the other end, which has small set screw. A rest, D, is on the other end of the gauge. This is fitted

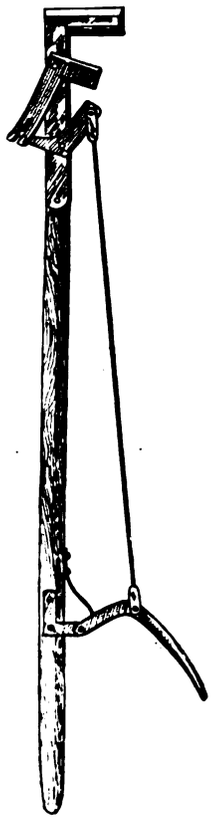
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so as to slide along the arm or beam for different lengths of axles. The arms D and B must be the same length.

A Fruit Tree Trimmer.

J. G. CLOWER, JR.

The accompanying engraving shows a fruit tree trimmer, which I designed myself. First secure a good piece of ash or other light, strong timber, and taper it from about 1½ inches at one end to a size convenient for a handle. The piece may be practically any length.



THIS HANDY FARM TOOL IS ANOTHER CHANCE FOR MORE PROFIT

Now take a piece of ¼ by ¾-inch steel, about 15 inches long, and bend at right angles at a point about three inches from one end. Now draw the upper edge of this short arm down very thin and sharp. This edge is used to cut off small limbs and should be ground very sharp. Now secure a piece of the same stock, seven inches long, and bend for the lower knife. Then cut a slot, ¼-inch wide by 1¼ inches long, in the end of the long arm of this piece. Now fasten this to the first piece by means of a rivet in such a way as to have the two shorter arms come together as the jaws of a shears. Then take a piece of steel six inches long, draw one end of it out to a point, and bend it to fit the slot in the other piece. Now rivet this latter piece just far enough along the pole so it will work the lower jaw properly. There should be an offset on this lever, so the pointed end of it will engage the slotted piece. Now take a piece of ¾ by ¼-inch iron and after bending it at right angles, fasten it at a point 15 inches from the lower end of the handle. A lever is then fastened to this latter piece by means of a rivet and a rod used to connect the lower lever to the upper one. The engraving shows very clearly the construction.

You now have your trimmer completed. I sell these at $1.25 each and can easily make three in a day. Most any scrap steel will do. It need not be the exact size that I have mine, but it should be strong enough for the work in hand. Now let us hear from some other brother as to the making of practical things.

How to Point Plows.

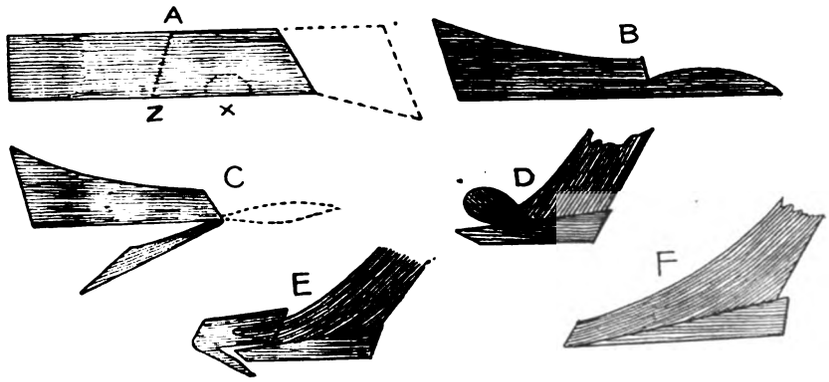
J. J. LLOYD.

To make old plow shares almost as good as new, take a piece of hammered lay steel, 1½ by ½ and cut as shown at A. Then draw this out as per the dotted lines indicated in A in the engraving. Be sure to have the short side of the point straight, then fuller the piece as per dotted lines at X. Now cut off the steel as per dotted lines at Z and throw out point as at B. Now draw the point and turn it as indicated at C. The plow share point is now split as shown at D. Now heat and work the land side smooth, then thin the point of share that is turned up. When this is done, reshape the share and insert point as shown at E. Now take a good heat, weld down on land side first and continue until the point is welded solid. You will now have a job that looks like F, the share completed. I have endeavored to make this as plain as possible so any good smith can do the work right.

A Rambling Discourse on the Craft in General.

ELI CASSEL.

Have been working at blacksmithing, horseshoeing and wagon and carriage building since April 1st, 1870. Have kept strenuously at it ever since; have met many ups and downs, but all at my own expense to a cent, and I don't know much yet. Have been learning ever since I began, and have found less room to boast of what I know than of what I don't know. I take little notice of the man who thinks he knows it all. But, "In a multitude of counselors there is safety," says the wise man, to which I say, blacksmiths not excepted; and I therefore believe in the need of a good trade journal like THE AMERICAN BLACKSMITH. I believe in protection in all business. But, when it becomes oppression or unjust discrimination, reckon me out.



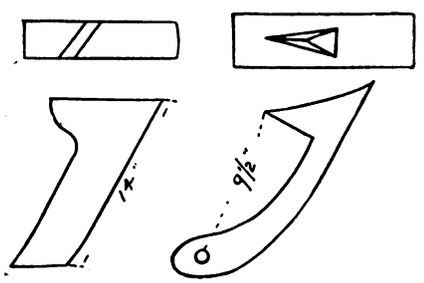
THE GENERAL SMITH NEEDS A BIT OF PLOW KNOWLEDGE THESE DAYS

I will say that I have always tried to increase my profits and to give my customers one hundred cents worth for every dollar. But I have not yet received all the dollars due me on promise to pay. What we need is a lien law. I find people very exacting on what they get on a promise. And some would rather owe a person all their life than cheat them. I used to make a little more than a living after working hard and long. Many susbstantial firms here in the East have gone to the wall since 1894, because of fair and unfair competition, because we have the "floater" everywhere, i. e., the man who comes into a community, stays a year or two, or as long as he can get his material on trust, thus enabling him to cut prices for the time being. He then moves into another neighborhood to practice the same business for another period. I meet them time and again as blacksmiths, woodworkers and carriage painters. I have known them to take all the work they could get at any price, some at less than half what it was worth. But it was easy for them to do that. They usually move out when compelled to face their creditors. In other cases they stay for years until they have victimized all the firms they can; they even tell salesmen the goods purchased are not as recommended, or no good, yet they used them all on the work they sent out. And here is another point: We need new and better laws to choke the rascals off. I say compel a man to do a fair business. Then if he beats me out of all I own, I will respect him because he is a better and more capable man than I. Honor to whom honor is due, is my motto.

For twenty years, and up to three and a half years ago, when telling a cus-

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tomer what I could build a good delivery for, I usually got the reply that the customer could almost buy two for that price. And so the abominable, worthless, too-dear-at-any-price, trashy, factory-made job, kept me out of work so often that I almost gave up hope of getting or trying to get orders for good work. Accordingly, I went along with the repair work and painting, doing all by hand, with an occasional order for a new job, until I tired of it in 1898. I then took a couple of trips to factories to see for myself. I bought a number of jobs of different makes, none below the medium quality, and paid as high as $112 down to $35.00 per job. I put them on the floor and advertised them rather extensively. When a prospective buyer looked them over, the first question was, "Did you build them?" I said no, of course. I then found trouble to get price enough for any of them to pay me to handle them. That one season's experience settled the factory work for me. Then I commenced to build medium grade work myself, by hand, getting all possible work done at a lumber mill. I put up a lot of jobs to sell or trade, but had no success, as I took in from one to three old wagons in exchange. In 1903, I took another tack. I purchased some new wood working machines with 2-horse power electric motor direct, connected to each machine. Today I have all the work I can handle. I do new jobs of good quality at fair prices and take no old wagons in return. With all the repair work, we have no slack times. Six men are busy always, and more help is needed in busy season. This, I believe, is because of good management, honest dealing and, most of all, power in the shop. I built another addition to the shop last fall; this is the third story since 1893. Now have a building about 28 by 124 feet; so you see I made slow, but sure progress. I see no reason to boast, for with my experience I should have arrived where I now am at least 10 of 15 years ago. But I am content, for "What can't be cured must be endured."



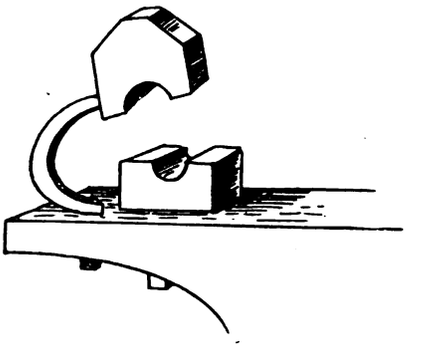
THE HOOK IS EASILY FORMED IN THIS TOOL

How to Make a Cant-Hook.

T. J. TRAMLE.

The first thing to do is to get the right kind of steel. I use black diamond cant-hook steel. The size of the steel is ½ x 1 inch. Cut off 21 inches and upset on one end down to 14 inches, but keep the body of your steel the same thickness. Keep the side of the steel that is intended for the back side of the hook straight and force the front part out for the bill of the hook. Don't have your upsetting run down more than three inches. The next move is to make your heading tool, and the better you make this, the better the hook. It should be made of steel, say 3 x 2 inches and 10 inches long. Punch a hole in it about three inches from the end the size of the steel of which the hook is made. Punch the hole slanting through the steel, say three inches from the end of tool on top side and two and one-half inches on the bottom side. This gives the bill of the hook the right pitch. Now you want a block of hard wood eighteen inches long and square on both ends. This is to lay the tool on when in the vise. Now bore one 1¼-inch hole in the block, four inches from the edge, on the same slant, as the hole in the tool, and let the hole in the block run out on the side so your steel will stick out. You can fasten the tool to the block. If round, cut a groove in it the shape you want the bill of the hook. This can be done at the same time you punch the hole. Do not cut the groove too deep, as it gives you a better chance to work your steel. Now you are ready to make a cant-hook. Place your heading tool on the block, take a heat on your upset steel, and come down on it with the sledge, striking a hard, drawing blow and driving your steel down in the groove in the tool. Do not work your steel too hot or too cold. After you have finished the bill of the hook, round up the corners, punch your hole for bolt and give the hook a gradual circle, so it will measure 9½ inches from the point of bill to center of hole, which is about right for all kinds of timber.

At welding wide tires, I am right at home. I take three heats on wide tires, or on 4½ or 5-inch tires or wider. Weld your outside first and the middle is easy. I am working in a factory where we turn out one hundred twenty-five finished jobs a day, crated and ready for shipment. There are 16 fires in the blacksmith shop and eight of these do nothing but weld tires. We never scarf tires in welding. They are cut the right length, enough allowed for the weld, and all narrow tires are welded in one heat. All tires are set cold. We have two West hydraulic tire-setters and they work to perfection.



A HANDY ANVIL SHEARS FOR ROUND STOCK

A Simple Anvil Shears.

ALVA S. PRIMMER.

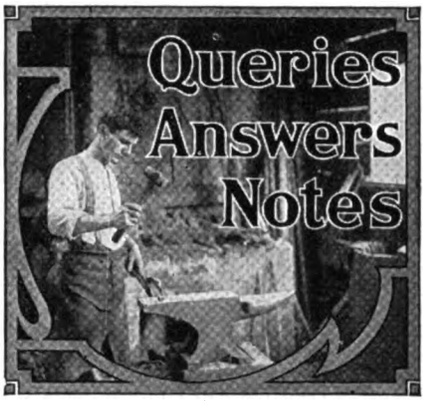
I have never seen any tool as handy as this one. I learned its use in a railroad shop. It is a pair of shears for use on the anvil. It is made of steel and is forked to fit the size of stock to be cut. But small iron can be cut in a large tool. The top tool need not be so deep as the bottom. One good heavy blow with sledge of 12 or 14 pounds will cut ¾-inch round. It can be made with a spring or, if a helper is handy, a handle same as on a chisel or fuller is best. Be careful to temper the inside of the fork for cutting and you will have no trouble. It is tempered same as a cold cutting chisel, but in the center of fork. Be sure to bring the two straight sides of both tools together. I have seen this shear do some very heavy work. A size for each rod is best, but you can make one do for several sizes of stock.

What a Gas Engine Means to the Smith.

A. M. CARLTON.

Easier work.
More trade.
Bigger profits.
Better work.
Higher prices.
Quicker work.
More money.
Less trouble with help.
Larger success.
More work.
Less trouble with competition.
Your own price-maker.

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The following columns are intended for the convenience of all readers for discussions upon blacksmithing, horseshoeing, carriage building and allied topics. Questions, answers and comments are solicited and are always acceptable. Names omitted and addresses supplied upon request.

Wants to Handle Dead Beats.—Please give me a few points on how to get rid of dead beats. I am just going in business for myself and I would like to have some advice on how to handle them with the least trouble. A. N. ATKINS.

A Question on Tire Welding.—Can some member of the craft tell me how to weld a wagon tire so the under lap will not burn before the top lap is hot enough to weld? Kindly answer through the columns of THE AMERICAN BLACKSMITH. THOS. H. LONG.

A Question on Stone Tools.—I would like to ask, through the columns of THE AMERICAN BLACKSMITH, for some brother craftsmen to give me some light on the dressing of stone mason and cutters' tools and tempering them. Where could I get a book or paper with information on such work? R. L. DAVIS.

Can You Lay Out a Wooden Axle?—Will some of the wagon makers or blacksmiths give their way of laying out a wooden axle for thimble bearing wagons? Kindly answer through THE AMERICAN BLACKSMITH, as it will be of great benefit to all repairmen. I have gathered a great deal of information from what has been said on different subjects. W. J. JONES.

Wants to Cure a Case of Thrush.—I read the pages of your valuable journal each month and find a lot of very handy and time-saving kinks which often assist me very much. I am a young blacksmith. I have been working here and running a business of my own for over three years, and am only 22 years old. I do quite a lot of horseshoeing and repair work. I would be pleased if some brother smith or farrier would give, in the columns of "Our Journal," a cure for thrush in horses' feet. A. DONALDSON.

The Cold Tire Machine.—A few words about tire machines. I would like to say to the man who intends to, or is figuring on buying a cold-tire machine that I am a cold-tire machine man, and that I have used and worked with five different kinds of cold-tire machines. Now I have bought one and, have had it in my shop eight months, with perfect satisfaction. I will say, brothers, that when this cold-tire setter goes wrong, it is the man who is operating it that is wrong, and it is not the machine. J. M. USSERY.

Curing Hoof Bound Feet.—To the brother who wanted to know how to cure hoof bound feet, I would say, that the way I cure them is with a bar shoe, giving light frog pressure. The first time shoeing, let the shoe stay on two or three weeks, then reset and weaken the toe as much as possible. Give full frog pressure now, and use some good hoof remedy. I use O. K. Hoof Remedy, and have had good success in using this method on hoof bound feet. The horse must be worked, so he will be compelled to place his weight on the affected foot. J. B. WINDLE.

Shoeing Stocks.—In reading my AMERICAN BLACKSMITH, I see that there is a man in Indian Territory who wants to know what shoeing stock is best. Now, I have the Barcus Stocks and consider them the best stock on the market, although not sold as cheap as some others, but I consider them the best, for you can shoe any kind of a horse in them, any heft from 600 pounds to 1800 pounds, and it works all right. I have had one for three years, and would not sell it for three times what it cost, for we shoe anything that comes along, and can do it as quick as out of the stocks. I am sure if he will get a Barcus stock, he will be well pleased with it. I take THE AMERICAN BLACKSMITH and think there is nothing better of its kind. C. N. HOLT.

Wants a System.—Will some of my brother readers kindly give me some information in getting up a system for running a shop? I am a young man and have not had the opportunity of studying business methods. I therefore call upon my brother craftsmen for information. I do a lot of repairing and also build quite a number of new wagons, but find it quite a difficult matter to keep tabs on certain jobs and repair work. I have a small plant equipped with electric power, which I find very profitable, have been in business about two years and have a very good trade. By getting the right kind of a system I believe I can save both time and money and make a large profit. FELIX L. BAUMANN.

A New Jersey Price List.—Here are my prices for shoeing. The month of February I found very poor for shoeing, but I have a very good stand. My shop is 30 by 30, all lined inside, and people say it is the best shop in the country.

Four new iron shoes	$1.25 to $1.50
Four new steel shoes	1.50
Four new hand turned	2.00
Two new bar shoes	$1.00 to 1.25
Four new Neverslip shoes	2.50
Four reset shoes	.40
Four old reset shoes, sharpened	.60
Four old reset shoes calked	.60
Neverslip calks	.05
Leather pads	.35 to .50
Resetting buggy tires	1.90
Resetting wagon tires	$2.00 to 2.50

My other work is in about the same proportion. ERWIN W. SMITH.

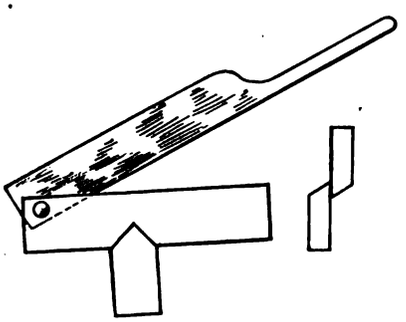
Business in Missouri.—The year of 1906 has, indeed, been an exceptionally prosperous one from a business point of view for me, and 1907 bids fair to duplicate and, perhaps, excel it. But I must frankly acknowledge that "Our Journal" has been of much importance and great assistance. I have the only shop in the city operated by power, and my competitors are all of the "Cheap John" type; yet I am tending to my own business with fair prices, and you may guess the rest. The reply by a brother of the craft to my article on price cutting in the May issue certainly made my heart feel good, to think that there was somewhere on the face of the globe, at least one member that experienced good judgment, as is more than our folks do here at home. H. E. KERNEK.

Some Prices from Iowa:—I will send you some of my prices on work:

Set four new steel plug shoes	$4.00
Set four old steel plug shoes	.80
Set one old shoe	.20
Sharpening ploughs	.50
Sharpening and painting ploughs	1.00
Making new lay	4.50
Cutting down wagon	8.00
Cutting down buggy	7.50
New wagon box	18.00
Hay rack	18.00
Water tank, round, 8 ft.	15.00
Set wagon tires	2.00
Set buggy tires	2.00
One spoke	.25
One half rim	.75
Wagon pole	2.50
Buggy pole	2.50

I think this is all that is necessary for me to give; you can see how these prices are all about the same. W. B.

A Handy Shear for Light Metal.—In reply to Brother Perry's request for a light metal shear I submit the following: I think this a pretty good one for light and hot iron as thick as ¼-inch and as wide as ½-inch. It is also handy for clipping corners, etc. To make it, take a piece of stock two inches by ½-inch and steel its edge with a strip of old rasp.



A SIMPLE SHEAR FOR LIGHT STOCK

Then weld on shank to fit in hardie-hole of anvil. Now make the lever of same stock, weld on handle of 1-inch or ⅞-inch round and drill ⅝-inch hole in end. Then temper and you will have a shear that will save you not only time but money as well. D. L. REID.

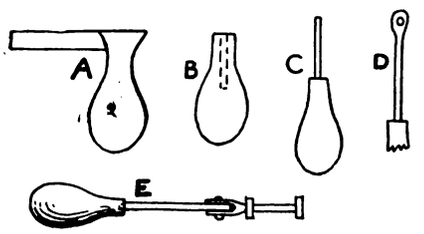
An Interesting Letter from Missouri.—I have only been here a little over two years, but have built up a splendid trade. I do no shoeing or plow work, and the only helper I have is my wife. We can do $150.00 worth of buggy work in a month and not work hard.

I only have two fingers on my left hand, so cannot handle iron and tongs, like a full-fingered man can. So my wife helps at the fire, takes out the bolts and rebolts wheels. We have taken off four old tires, bent, welded, set, drilled and bolted four wheels, and delayed the customer but four hours

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I use hand power only in the shop. I have a drill with a drive wheel from a corn sheller on it and can drill 72 holes and counter sink them in ⅝-inch steel tire in one hour and ten minutes. Some of my customers come 22 miles, in fact, I have the buggy work of the county. My shop is 36x50 feet. The wood shop, 20x50, is lathed and plastered, so I have a warm shop for winter work. JAS. F. BOYD.

A Word from a Gun Smith.—I went to the anvil at 15 years of age. I work at it because I love it. The first sounds that reached my ear were the clank of the anvil. I was born within 40 feet of the smith shop, and father kept five men, so you see I naturally liked the wel-



ANOTHER METHOD OF PUTTING IN A BELL TONGUE

come ring, and have kept within hearing ever since. Twenty-three years ago I learned blacksmithing at the shops of Smith & Wesson, Springfield, Mass., and gun-smithing is my specialty, while fine and intricate forgings are my hobby. But I have not learned all the trade yet. I have worked just long enough to find out a part of my own ignorance. I use THE AMERICAN BLACKSMITH as a bracer. It's a fine old tonic. Don't get a big head, you new beginners. Find out first, and then make your work herald your coming. E. C. J.

Another Bell Clapper.—I saw an article in the February issue, from an Arkansas smith, on repairing a bell clapper. I was called on to make one a day or so ago. The customer furnished me with a piece of casting from an old press dog which had a ball about three pounds weight. I cut it off all around with my chisel and began by drilling about 2½ inches down the stem. The shape of the ball, when brought to me, is shown at A. B shows how this clapper looked when chiseled off and ready for threading. I then flattened the end of a ½-inch rod and threaded the other end of it. I then took another piece of round iron, and after squaring it up, made it very wide. I then welded it to the piece screwed in the clapper, cutting open the end. I now put the flat end of the clapper-staff in the slot, drilled a small hole through all and put in a small rivet. This served my customer all right. It is just as he wanted it, as the old one would at times, while ringing, run all around the rim of the bell and make no sound whatever. The one made can't do this. FROM MISS.

An Interesting Nebraska Letter.—My shop is 24 by 40 feet. I have plenty of light and also plenty of fresh air. At the back and outside I have a pump and water trough fur public use. The back end of the building is planked. In the front end and up 7½ inches from the floor I have a platform four feet wide by 24 feet long where I keep my wagon stock. The shop stands east and west, so that the side is towards the south. It is very nice to have the sun shine in during the winter. I have plenty of work and get a good price for it. The only thing I regret is that I have not more time to write for "Our Journal." I teach a brass band at this place twice a week and the other part of my time seems to be pretty well taken up with some things.

I guess I am different from some men. I like to get out of the shop among my fellowmen and have a visit and a good time. If there is a ball game in town, I close up and go out and see the game and return to work when it is over. I know quite a number of smiths that always stay at home, and they don't seem to prosper as well as they should. I never drop into a town that I don't call on the blacksmith and try to learn something new. M. B. WAIDLEY.

An Arkansas Letter.—We never see a letter in THE AMERICAN BLACKSMITH from Arkansas, so will write a few lines. Our shop is 60 by 30 feet. We have a blower, a bellows, a Western Chief drill press, a Standard tire shrinker, and a good set of stocks and dies and all the small tools we need. We are going to put in a gasoline engine, a band saw, a turning lathe, an emery stand and a Barcus horse stocks very soon, for we have a large trade and do a great deal of work. Our collections are very good. We do a great deal of credit business, but do not like it. Our prices on some things are low, but in general are very good, and compare well with other prices we see in the paper.

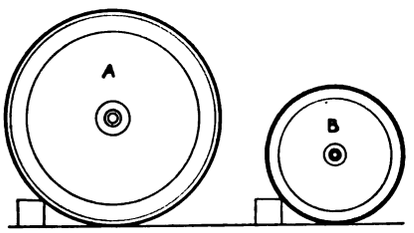
Brother Craftsmen, in regard to blacksmiths organizing, we think it is one of the finest things on earth for the craftsmen. And we would be glad if every craftsman would be compelled to take a rigid examination and to have a diploma before he could run a shop. Then we would be able to get fair prices for our work and do a cash business. We do all we can for organization, and discourage Dick, Tom and Harry, at the cross roads, who with a little bellows, a hammer and a pair of tongs, nail shoes on horses and rasp off their feet for 25 or 30 cents a pair. The customer thinks it is all right, but pretty soon his horse is lame. We would like some other brother craftsmen from Arkansas to answer our letter and to hear how their organization is going on. WILLIAMS & PRICE.

A Mississippi Letter.—As I haven't seen anything for quite a while from this state I will give you some of the prices in this section. We all keep as close together on our prices as possible, which I think is correct:

Shoeing four new shoes	$1.50
Resetting four old shoes	1.00
Shoeing in stocks	2.50
Buggy and wagon spokes	$ 15 to .25
Rims from	1.00 to 3.00
Wagon tongues, each	1.50 to 2.50
Hounds, per pair	3.00 to 4.50
Bolsters from	1.00 to 4.00
Setting buggy tires	2.50
Wagon tires, per set	2.00 to 4.00
Sharpening one horse plows, each	.10
Pointing one horse plows, each	.25

All other work in this line is in proportion. Some of the prices are too cheap. We are in good shape for running our business and have been successful for several years. If any blacksmith is downhearted and low-spirited because of not making a good living and some money at his trade, I would strongly advise him to read THE AMERICAN BLACKSMITH. It will put new life in him and if he has any "get-up" about him he will prosper. I have been in the blacksmith and horseshoeing trade 20 years and, after I commenced reading THE AMERICAN BLACKSMITH, it was the same benefit to me in business as a good tonic is in illness. The healthiest, stoutest men are real clean blacksmiths. Dirty blacksmiths get sickly as a general rule. Try it, those that need it. Keep clean. J. W. LAMBERT.

A Large Spindle or a Small One.—I am no college graduate and I don't think I can give this subject justice at all, though I can give my opinion and experience. Take, we will say, any ordinary 3 by 9-inch wagon. Load it with 2500 pounds of stone and pull the wagon on a pike or some smooth surface. Then place on the same wagon a skein 4 by 11, load exactly the same and go over the same ground. You will find that the small skein will prove lighter in draught, but pulling over hills and ledges or a rough road, or where there is climbing for the wheels, the larger the skein the easier to pull. Suppose, for instance, you have a wheel 50 inches high. You roll it to a block four inches square. You will then find that much of the wheel has passed beyond or over the block. See the engraving at A. You can very easily see that you have quite a little of the weight of the wheel over the block where it first strikes or gets to it. Now take a 40-inch wheel and place the same block under this wheel as at B. You can see that very little of the front of the wheel



WHICH IS EASIER TO HANDLE—THE LOW-WHEELED OR HIGH-WHEELED WAGON?

has passed over the block. The greater part of the wheel, over the block when the wheel strikes the block, helps to pull the wheel over the block so it makes the draught easier and lighter on a team. You can calculate skeins the same, but the difference does not prove as easily and quickly as in the wheels. P. M. WADE.

A Letter from Kansas.—I saw a very nice letter in the February number from Mr. V. Gieber, of Indian Territory. I am personally acquainted with him and admire his pluck in learning his trade. He was in my shop about a year and a half ago. I will give my shop equipment, and let Brother Gieber know that I read THE AMERICAN BLACKSMITH regularly and am glad to hear from him. I started to learn the trade eight years ago, bought out the man that I worked

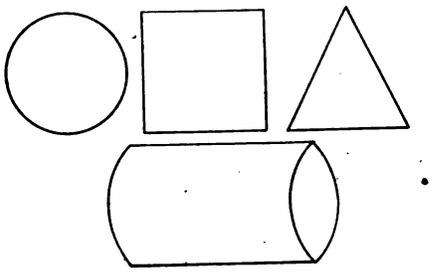
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for. I bought his few tongs and hammers, an old leaky bellows and started. I worked that way for two years and then bought a 2½-horsepower Webber Junior. It proved too small after a while and we got a five-horsepower engine. I now have a swing lathe, an emery wheel, a tenoning machine, a Little Giant drill, a wood lathe and a trip hammer of our make that has a 50-pound head and strikes 250 blows a minute with an 8-inch stroke. We have sharpened 14 plows an hour on it. I have a shop 24 by 60 and am in a town of 600 population, with only two shops. I repair everything that comes my way from automobiles to sewing machines and do all kinds of brazing. We are in a rich farming country, where there is lots of wheat raised and we have all kinds of machines to repair, besides lots of engines and boilers. My shop is one of the best equipped in the county. I see lots of articles on power and power machines. I should say they do pay and will advise every blacksmith to get power as soon as possible, as it will net him big money on his investment. How about it, Brotber Gieber? Have you not found it so? We are glad to hear from you, Brother Gieber—better come again. S. J. PEMBERTON.

A Reply from Missouri.—I see Mr. Brooks, of Canada, in the February Journal tells how to fix a back-dished wheel, but he does not say how he filled the vacant space at the end of the spoke tenons. He also makes light of what I said about singletrees and spring bars from old shafts. I know by practical experience that anyone who is a workman can make a singletree, a spring bar, a side bar, etc. from a buggy shaft. Because the timber should happen to be in the shape of a shaft does not lessen its durability in other work. Our good material has advanced over 60 per cent. in the past year. If at an idle time we can produce a singletree, a side bar, an axle bed, etc., we have gained that much clear profit. He also says he don't think I could do a jobbing trade in his town very long. Perhaps not; I have worked in Chicago, Kansas City, Omaha, Denver, Sacramento and other cities of 25,000 to 30,000 population. I have always worked up my scraps to advantage, but have never yet had to cut prices to keep from starving. A trade journal is no place to cast reflections and to air a jangle. "Our Journal" is for the elevation of the craft, and they are few so smart but they can learn from another's pen. I believe I am entitled to space for reply and respectfully ask that some be granted me.

I wish to speak of welding the side brace on buggy tongues. Some come to the shop that have been welded before and have been stretched to make them long enough. Most all smiths cut out and weld in a new piece. Try my way, (I call it my way because I never heard or saw it used before). Place ends together and dot, set your dividers to dot and then weld. Just stick them together. Now take bailing wire and wrap your weld, say for length of two inches. Wrap about twice around the rod. Now place in fire and keep turning to heat slowly and use sand. When hot take out and weld up. That leaves your weld within a weld and plenty of stock to stretch. You will find it makes a good strong weld, one that will never come back, and it is done quicker than cutting out. You must heat slowly or the wire will burn before the rod gets hot. JAMES F. BOYD.

A Letter from South Africa.—We have 11 fires in our shop, but at present there is great business depression and only five fires are going. One man, of course, does odd jobs amongst the wagons, as our business is principally wagon and trolley making. But we take on anything; a good deal of agricultural implements as well, but mostly repairs in that line. We have a fairly well equipped shop, with steam hammer, also a power hammer, the latter a very handy tool, but we use the steam hammer for the heavier work. All the fires blow by a fan. We have one bending machine, one heavy punching and shearing machine, three boring



CUT ONE PIECE OF STOCK TO FIT THE THREE HOLES

verticals, an emery stone, one grindstone, two screwing machines, one heavy screw-cutting lath and last, but a very important tool, a heavy tire-setting machine, power driven. Then there is the wood machinery, saws of various size, boring and mortising machine, spoke turning and tenoning machine, a band saw and various other tools, beside a machine for turning the wheel when built. The tiresetting machine is a splendid tool and saves a lot of labor, as we have set tires up to six inches broad.

I also send a small puzzle. The engraving represents three holes and a piece of one-inch round stock. The thing is to fit those three holes with one piece of the one-inch round stock, no fire being allowed. This is how it's done: First square one end of the rod and draw a line exactly across the end in center. Then mark one inch from the end and taper the rod from the one-inch mark to exactly the center on the end. Having done this, saw off at the one-inch mark. It will then be possible to put the piece on its side to fit the square; the bottom part will fit the round, and the triangle is seen from the plug.

I would say about measuring rings: Every smith should have a copy of Foden's Mechanical Tables, to be had from the office of THE AMERICAN BLACKSMITH. This book gives the amount of iron for any circle from one-eighth of an inch up to over 20 feet. It also gives weight of iron. No smith should be without it. You can carry it in your pocket or have a convenient place for it by the forge. Three and one-seventh times the diameter and three times the thickness of the iron is alright at times but for accuracy, every time get the book. WM. W. WATT.

A Good Talk on General Work.—I agree with the gentleman who says you never see a well-balanced horse interfere. That is not the kind. It's the ones that are not straight; the ones in which the arch sits an inch or two inside of the hoof; the one that travels all over the road and sets its foot wherever it happens to be. These are the ones that we have trouble with and the ones we wish to know how to shoe.

Say, Mister Cold-Tire Setter, why is it, if your machine is so much better than the old way, that the manufacturers won't put them out on trial? Why do we find them sitting idly in the shop from one year to another while the smith sets tires the old way? I ask this for better information. I should like to try one but don't like the idea of putting $150 or $175 in a machine that is not worth the room it takes up.

The brother who says he can fill a buggy wheel for $2.00 certainly does not consider his time worth much. We charge 20 cents a spoke in this part of the country. This means $3.20 a wheel to say nothing about the rim and tire. And I put on a new wheel for $3.50 and make more clear money than at trying to fix the old one, besides a new one is far ahead of what an old filled one would be. My customers are also better satisfied, to say nothing about getting it cheaper. Who sets the price for your work, brother, you or the other fellow? If it is the other fellow, and he sets the price too cheap, why don't you let him do the work? If you set it too low, stop kicking the other fellow, but kick yourself. You will be sure to get the right chap. No man can stay long and do business for less than it is worth. Our prices are as follows:

New shoes, each	$ .40
Old shoes, each	.20
Neverslip, a set	4.50
Neverslip calks, each	.05
Wagon and buggy tongues	2.50
Cross bars	.75
Wagon axles	3.00
Bolsters	1.50
Hounds	.75
Doubletrees	.50
Singletrees	.35
Wagon reach	1.00
New plow and lister lays	4.00
Pointing shovels	2.00
Set wagon tire	2.00
Buggy tires, set	2.50

Our other work is in about the same proportion. My motto is: If you can't make anything out of a job, you had better let it go than to take it and lose on it. B. E. ROBINSON.

How to Operate a Power Shop and Please Your Customers.

BY TOM TARDY'S BROTHER.

Have been a subscriber of your valuable paper for some two years and believe I have read almost every article from the various shops, situated all over the world. All seem to be enjoying the same prosperity, all getting rich, installing new machinery, keeping abreast of the time, and putting in power. All the descriptions of the shops I have read in the last two years are different than my shop. I will try to give you a true picture of mine, or the way it looks to me. My building is a little, old, black, swayback shack, with a thousand holes in the roof, partly

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covered with iron, felt and paper. There are a few places called windows, but the lights are about all broken out and old galvanized iron, boards and rags are used in their stead. It is very dark inside and dirty. Some places there is a board floor and other places dirt. The board floor is all full of holes and is patched up with old boards, pieces of iron, and in some places filled with cinders. When it rains you need a rubber suit, and in winter you need felt boots and an Eskimo suit. You will find a few old horse shoes, tongs, pinchers, cold chisels, hammers, single-trees, fork handles, files, rasps, nippers, a few bars of iron in the old smoky rafters, a few spokes, an old bellows and, in some old boxes nailed to the wall, you'll find some bolts, rivets, horse-shoe nails and various other things. There are a couple of forges and blowers that turn very hard and make much noise; some old worn out vises loose on the bench, anvils all chipped off on the edges, hammers all battered up with their handles split, and some tongs that won't hold anything. Pincers and chisels are very hard to find when wanted, and you don't usually have to look over 30 minutes to find a center punch. There are a few screw-cutting tools, also an emery stand and wheel that are very useful in grinding off the bumps and rough places. This latter tool can also be used in place of an electric machine, as the sensation when trying to grind is just about the same.

My gasoline-engine is the same as all the others—the best one made and it never gives any trouble except when trying to start. It will always start when there is a good strong man at the drive wheel. I have occasionally started it alone in less than one-half day, after assembling and testing the dynamo and battery, and then finally lighting the torch. And when once started it will never stop unless the gasoline becomes exhausted, the pump fails to work, the dynamo gets a flat wheel, the battery plays out, the circuit breaker arm fails to connect, the igniter pin gets a scale on it, the insulator washer burns out, or the contact pin gets too hot.

My trip-hammer is the best made, and in nine years of use it has never broken except when I was using it. I have sharpened several plows with no breakage and sometimes, when rushed, which is quite seldom, the spring will break, the slide bolts come out, the top box breaks, the wrist pin slips out, the catch sticks, the pitman wheel breaks in two, and quite often the hammer head lift breaks off. There have also been a few other small breaks, but they are too small to mention. And the repairs for one season, counting time, expense and telegraphing, will not exceed $49.49. But this small item amounts to nothing when running a power shop.

The band saw was recommended to be a great money-maker in sawing hounds, felloes and all such work. I find by actual tests that we can buy plank and saw out felloes at a cost not to exceed 12 cents each. Of course this does not count time, gasoline, broken saws, silver solder and files, besides the extra amount of time you put in dressing them up. The finished felloes, true to circle and rtue to size, cost about nine cents. You can easily figure out the amount you are saving or making. The circular saw is also an essential that the small country shop must have to rip out reaches, double-trees and do sawing for the lumber yards. My experience in sawing a hay load of lumber for the yard cost me a couple of burned up saws, broken belts, several files, and lots of good time. But when a man runs an up-to-date power shop, that small item will hardly be recognized in his expenses.

A tenoning machine is another time-saver, for sometimes the tenons will be



JUST BEFORE THE WHISTLE BLEW. BROTHER WILLIAM G. BULL, WHO RUNS A YORK STATE SMITHY

the proper size and sometimes about the size of a lead pencil, and in tenoning a set of wheels and boring the felloes I find that one will not spoil over one-third of them. Of course the expense of a few spokes and felloes spoiled is nothing compared with the time saved where you have a power shop. I also recommend the wood lathe in all small country shops. Your experience in spoiling a few 4 by 4's, a few chisels, and a long 6 by 6 rolling off your arms and against your head, will convince you that the art of learning to turn will more than offset the time, gasoline and chisels and money you have lost. Power I know pays in the smith shops. The wood planer was recommended to be indispensable to complete the wood working department, and after eight years of use I find it a safe investment, as the money can't be spent again. I cannot see how the small shop can get along without one, for in eight years you will probably want to use it two or three times, and you can get it uncovered, get the belts tightened, oiled up, the rust scoured off and the knives adjusted, ready to use, in not more than two or three hours.

Being flooded at each mail with pamphlets, circulars and letters regarding the revolution of the tire-setting machine, I read the testimonials of hundreds of my brother craft. Tire setting was made easy and became a regular gold mine; hundreds of tires set each month, and you pay for the machine in a few weeks. It sets them while you wait, saves time, burnt and charred bellows, burned arms, smoke in the eyes, hot water on the feet, sweat on the brow and various other things that looked good on paper. I could not resist the temptation to become the owner of the get-rich-quick-machine. And now when a customer drives up to have a few tires set, all one has to do is to grab the jack, raise the wheel and roll it in the machine. If he has a strong back and arm he can lay it in, otherwise he must use the block and tackle. After carefully adjusting the wheel in the machine, you will proceed to pour turpentine on the several fingers and thumbs from which the nails have been knocked loose. After all fingers have been carefully wrapped, adjust your wheel again, work on the lever a few minutes, occasionally knocking some of the remaining skin off your hands with the wrench. After completing the circle of the wheel the 18th time, the sweat will be running quite freely into your eyes and down your arms and body. Your breath will come short and quick and your heart will be at about 250 or 300. Being completely exhausted, you will be compelled to take a short recess for several minutes. You then wipe out your eyes, take off your shoes, put on a dry pair of socks, sit in a cool shady place until your condition again becomes normal. Then, with a wrench, you proceed as before until all the screws are tuned to high C. Now, with a hammer and some shingle nails, proceed to nail on the 8 to 28 three-cornered pieces spilt from the felloes and smooth them over so the customer can't see that all the felloes are ruined. You then proceed to take the wheel out of the machine or have your helper do it, (this latter method is so much easier), and look it over carefully. If you see daylight between the tire and the felloes at more than 16 places, you take a sledge and heavy hammer and drive down all high places. You now discover that you are where you started. If physically able, you repeat the operation once more. Or, if your customer is blind, or if the work is accompanied by a hired man or a small tip, it will probably pass. If you are fortunate enough to have Samson for a helper, and Delilah had not trimmed his hair the previous day, you can possibly get the other wheels out that same week. Of course, on buggy wheels it is different. All you have to do is to take out all the bolts, wedge up the spokes, put tire back on and put in new bolts. Of course the heads will have to be ground or filed off or the tire re-counter-sunk to make a smooth surface. You now put it in the machine and proceed as before. Of course you may find that there will be four or five spokes broken in the operation, but these can be jumped back in the machine by closely following the printed instructions. If, after the wheel is ready to replace on the buggy, your customer kicks about seeing daylight between the tire and felloes, tell him that the machine is a corrugated tire-setter and you will guarantee each wheel to look alike after the operation. I believe the tire setter is a trade getter, at least I am convinced that it is, as it gets it away where it don't bother you much. I believe that every little country shop should have at least one of these machines. I would not advise anyone to buy more than one to start with, as more could be added when they are required.

C. B. JEWETT.

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THE STANDARD TOOL CO.

Countersinks for Blacksmiths' and Wagonmakers' Use.

Made with shanks fitting all Bit Braces and with ½ in. and ⅝ in. round shanks, fitting all makes of Blacksmiths' drill presses. Made of good material, with proper angles and tempered right for this purpose.





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Horse Nails.



V stands for **VULCAN**;
Powerful and Strong,
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You Can Never Go Wrong.

THE QUALITY OF VULCAN HORSE NAILS IS FULLY GUARANTEED.

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SEYMOUR, CONN.
SOLE MANUFACTURERS.

WING RUBBER CARRIAGE TIRES

are made from tough, durable, lively NEW RUBBER. **Quality** is the first consideration. Our **"Wing"** Tire will outwear several ordinary rubber tires. The wings (see cut) keep water, sand and grit from working between the channel and the tire, to wear out the tire from underneath, Write for particulars.



GOODYEAR Trade Mark.

The Goodyear Tire & Rubber Co.,
Carriage Tire Department, AKRON, OHIO.
Boston, New York, Buffalo, Chicago, Cincinnati, Detroit, St. Louis, Denver, Los Angeles.

NICHOLSON FILE COMPANY

NICHOLSON.

PROVIDENCE, R. I.
U. S. A.
MANUFACTURERS OF

THE K&F TRADE MARK.



FILES AND RASPS

Blacksmiths Recommend Our Rasps

——BECAUSE——

THEIR WEARING QUALITIES HAVE BEEN PROVEN.

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Prices Current — Blacksmith Supplies.

The following quotations are from dealers' stock, Buffalo, N. Y., Apr. 1, 1907, and are subject to change. No changes have taken place since last month's quotations.

All prices, except on the bolts, are per hundred pounds. On bars and flats prices are in bundle lots.

Bars—Common Iron and Soft Steel.

¼ in..	round or square;	Iron, $2.95;	Steel,	$2.95
⅜ in.,	" "	" 2.55	"	2.40
½ in.,	" "	" 2.35	"	2.20

Flats—Bar and Band.

¼ x 1 in.,	Iron.....	$2.40; Steel.....	$2.40
¼ x 1½ in.,	"	2.80; "	2.80
3-16 x 1½ in.,	"	2.50; "	2.50

Norway and Swedish Iron.

¼ in., round or square.....	$4.90
⅜ in., " "	4.50
½ in., " "	4.30
¼ x 1 in.....	4.30
¼ x 1½ in	4.20

Horseshoe Iron.

For No. 1 shoe, ⅜ x ½ in.....	$2.50
For No. 2 shoe, ⅛ x ⅝ in.....	2.50
For No. 3 shoe, ⅝ x ¾ in.....	2.50
For No. 4 shoe, ⅝ x ⅞ in.....	2.50

Toe Calk Steel.

½ x ⅜ in. and larger...	$3.00

Carriage Bolts. (Net Price per Hundred).

¼ x 2 in.....	$0.54	⅝x2½ in.....	$0.82
¼ x 2½in.....	.58	⅝x3½ in.....	.96
¼ x 3 in.....	.62	⅝x6 in.....	1.31
5-16x 2 in.....	.65	½x4 in.....	1.70
5-16x 3 in.....	.75	½x6 in.....	2.10

Spring Steel.

⅝ to 1¼ in. Rounds. Op. Hearth $3.00, Crucible $5.00
1¼ to 6 in. by No. 4 gauge to ½ in. Flats " 3.00, " 5.00

PATENTS FRANKLIN H. HOUGH, Washington, D. C. No attorney's fee until patent is allowed. Write for Inventor's Guide.

PATENTS PROTECT YOUR IDEAS

Send for Inventor's Primer. Consultation free. Established 1864.

MILO B. STEVENS & CO.,
852-14th St., Washington, D. C.
Branches at CHICAGO, CLEVELAND, DETROIT.

CUMMINGS & EMERSON

Blacksmith and Wagon Makers' Supplies,

PEORIA, ILL.

THE BARLOW HARDWARE COMPANY,
CORRY, PA.
Carry a complete line of Horseshoers' Supplies, Wagon and Carriage Material
Write for 1907 net price CATALOG just out. IT'S A MONEY-SAVER.

The Campbell Iron Co.
ST. LOUIS, MO.
Carry complete line of Horseshoers' Supplies, Wagon and Carriage Material.
WESTERN AGT. FOR DITZLER COLORS IN JAPAN.
Write us your requirements.

THE
Williams Hardware Co.
Minneapolis, Minn.
Wholesale IRON, STEEL and HEAVY HARDWARE.
CARRIAGE AND WAGON WOODSTOCK.
HORSESHOERS' SUPPLIES.
Send us a Sample Order.

WANTED AND FOR SALE.

Want and for sale advertisements, situations and help wanted, twenty-five cents a line. Send cash with order. No charge less than fifty cents

FOR SALE—Barcus shoeing stock, good as new, price $35. Write B. F. Scott, Bureau County Dover, Ill.

FOR SALE—Blacksmith shop, tools, stock, house and two lots: F. POLZIN, Parker, Colo.

WANTED—Ambitious men to act as agents for our fine line of calipers, etc. Address E. G. SMITH CO., Columbia, Pa.

FOR SALE—Neverfail brazing compound for cast iron, etc., sure and simple. Put up in $1, $2.50 and $6 lots. Neverfail Brazing Co., LeMars, Iowa.

WANTED—Steady position with blacksmith by young man who desires to finish trade. Address IRWIN BOWER, Cogan Station, Pa.

WANTED—Agents to handle a line of Taps and Trimmings and up to date specialties. BUOB & SCHEU, Cincinnati, Ohio.

WANTED—All around blacksmith and shoer. Must be sober, steady and agreeable. $4 per day. R. E. CLARK, Steamboat Springs, Col.

FOR SALE OR RENT—Blacksmith shop and residence. Also necessary machinery and tools. Doing a good business but wish to retire. For particulars address T. J. O'CONNOR, New Lenox, Ill.

WANTED — Blacksmiths to handle Mineral Heave Remedy. No cure—no pay. Liberal terms to agents. Write for booklet, MINERAL HEAVE REMEDY CO., 418 Fourth Ave., Pittsburgh, Pa.

WANTED—Good wagon smith. No time lost, steady work at $2.50 to $3.00 per day. Address JOHN M. MAYER, cor. Mill and Chambers Sts., Kingston City, (Rondout,) N. Y.

PRINTING—We want to do printing for progressive blacksmiths. One hundred best letter heads, 50 cents. Samples sent free. "STYLE" PRINTING CO., Maine, N. Y.

WANTED—Salesmen for Extension Axle Nuts. Sure cure for wabbly buggy wheels. Exclusive territory. Big commission. Special introductory offer. HARDWARE CO., Box Z 10, Pontiac, Mich.

WANTED—Traveling men who visit the carriage, implement and livery trade make big commissions, selling our steel and rubber-tired wheels, as a side line. Why don't you try it? THE BOOB WHEEL CO., Cincinnati, O.

FOR SALE—Engine Lathe, swings 9¼ in., takes 25 in. between centers. Complete with full set change gears to cut all size threads 8 in. to 40 in. Price only $41. Address, L. F. GRAMMES & SONS, Allentown, Pa.

TO MY BROTHER BLACKSMITHS—An excellent side line and money-maker without loss of time. I have a Heave cure that is right. It is not a poisonous medicine that will injure the horse like other Heave remedies. It is pure and wholesome and builds up the horse's physical condition besides curing him. I will send this receipt to any address in the United States upon receipt of two dollars ($2.00). Fraternally yours, I. F. BROWN, Litchfield, Minn.

MR. BLACKSMITH—Save money and lengthen your life by using my newly invented machine to trim horse's feet by power. This machine can be attached to any power and can be used for rasping, sawing, boring, drilling, polishing, etc. I would like to hear from every blacksmith and woodworker intending to buy such a machine at $25. It will be sent on free trial, as soon as I get my patent papers. Address H. C. WARMUTH, Pardeeville, Wis.

WANTED—General blacksmith and horseshoer, man capable of ironing new work. Splendid shop to work in with plenty of light and fresh air, fronts on main street. Labor-saving machinery, trip hammer and other machinery run by power, making work as easy as possible. Good tools, large stock, two fires, good size town, German community. Wages, $12 to $15 per week to the right man, by the year only. Prefer a man who does not drink. W. G. FLORA, Forreston, Ill.

FOR SALE—A fine chance for a Blacksmith. Two full sets of tools for blacksmiths and wagon-maker's work, one 3 H. P. Olds gasoline engine, power saw, emery stand, drill press, disc sharpener and all kinds of tools that belong to a well-equipped shop. All as good as new. Also about $400 worth of stock, wood, iron and steel, in one of the best towns in the southern part of Minnesota. Good farming country. Good pay and an A 1 chance for the right man. Will sell the above for $1350. Shop 22x40, built one year ago, $400. Will rent for $5 per month. Only shop in town of two railroads. Address H. PAULSEN, Taopi, Minn.

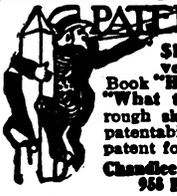
PATENTS Write at once for most liberal offer ever made for obtaining patents and ask for Inventors' Guide, the best book published Est. 20 yrs. WM. H. MOORE, Wash. D. C.

PATENTS Herbert Jenner, patent attorney and mechanical expert, 608 F St., Washington, D. C., established 1883. I make an examination free of charge and report if a patent can be had; also the exact cost. Send for circular.

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All weights and diameters from 6 to 60 inches.
Ask your Dealer for our line.
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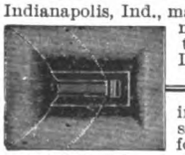
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A Full Line of Horse Nails
Send for Catalogue, Prices & Samples.

DEATH TO HEAVES! NEWTON'S

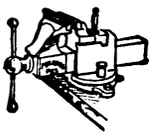


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$1.00 per can, of dealers, or express prepaid.
THE NEWTON REMEDY CO., TOLEDO, OHIO.

THOMPSON EXTENSION TUYERE IRON CO.,
Indianapolis, Ind., manufacturers of The Best and most Reliable Tuyere Iron on the Market. Size 15x20 in. Depth 5½ in. Weight 65 lbs.



Long or Short fire, from 2 to 14 ins. Great Fuel Saver. Thousands in use, ask your Jobber for them, or write us direct.



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LARGEST LINE IN THE WORLD
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Every blacksmith knows how troublesome contracted feet are; how they get *blamed* for this fault when the cause is really the owner's.

Here is a way to overcome both the trouble and the blame, and at the same time *make* a good many *extra dollars* in a year besides adding a good many new customers to your shop.

Get acquainted with *O. K. HOOF REMEDY*—the quickest, surest hoof remedy you ever saw. Send to us for a trial can and test it for your own satisfaction. It is not only fine for Contracted Feet, but Corns, Dry, Cracked and Brittle Hoofs, Quarter Cracks, Thrush, and for nail pricks it is especially good. If applied promptly it will absolutely prevent lock-jaw.

If it does this, *and it does*, wouldn't you like to handle it and get the liberal *profit* we allow our blacksmith agents?

Wouldn't you like to pick up these *extra dollars* that can be earned so easy, besides it will bring you new trade who will hear of the good work *O. K. HOOF REMEDY* does?

Walter L. Long, horse-shoer, Blue Island, Ill., says.—"It certainly does all you say it will. Grows hoofs quicker and keeps them in better condition than any other remedy."

It has grown entire new hoofs in nine months' time. Remember it is a remedy so good you can sell it on a money-back guarantee if it fails. We want you to handle it in your town. Write for terms. Suppose you send 25c. for sample. **THE O. K. STOCK FOOD CO., 650 Monon Building, Chicago, Illinois.**

SHARP DIES

Are what are needed in order to cut good threads, and you can always have them if you use a



"DUPLEX" Die Stock Set.

The dies in these sets are easier to sharpen than a knife; this fact enables you to get the full wear out of them. **Write us.**

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STEEL STAMPS, LETTERS and FIGURES
For marking tools, making name plates, etc.
BRANDING IRONS.
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BLACKSMITHS' HOOK AND HANDLE RULES

Made from hard rolled sheet brass, one-tenth inch thick, one and one-sixteenth inch wide, with heavy gradations and figures, graduated from the end in sixteenths of an inch on one side and from the inside of the hook in sixteenths of an inch on the other, adapting them for taking correct measurements from either the outside edge of a hot piece of iron, or from the inside when held against a corner. Graduated twelve inches, have flat handles and measure over all sixteen and three-fourths inches.

Price, postpaid, $1.15. Catalog of fine Tools Free.

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NATIONAL TWIST DRILLS.

FORGED STEEL WRENCHES.



LONG "S" PATTERNS FOR BLACKSMITHS.

Set of five (5) wrenches fitting nuts on bolts 3/16, 1/4, 5/16, 3/8, 7/16, 1/2 in., 6 1/4 to 10 1/2 ins. long.

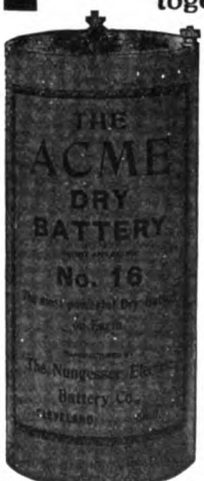
The Whitaker Mfg. Co. CHICAGO.

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Nineteen Years of successful Battery making enables us to place upon the market the "Best Ignition Battery" in the World.

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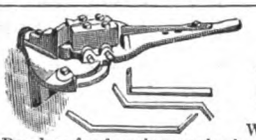
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"WABBLE CURE" Axle nuts make old buggies run like new. Big commission. Special introductory offer. Hardware Co., Box 710, Pontiac, Mich.



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Kerosene Engines
Gas, Oil and Alcohol
1½ to 70 Horse Power
Safe, Reliable, Economical
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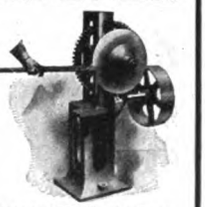


Angle Benders.

We make hand power Benders for forming angles in stock 1 in. thick and under. Light stock can be bent cold.
WALLACE SUPPLY CO., 916 GARDEN CITY BLOCK, Chicago.

THE MONARCH DISC SHARPENER

brings the business to your shop. The wonderful work that the machine does can hardly be believed. Designed by a practical smith and made by the largest and oldest iron works in the West.



Interesting circulars free. Write today.

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Author and Publisher of
"RICH'S NEW ARTISTIC HORSE SHOEING."
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PROF. GEO. E. RICH,
Artistic Horseshoer and Teacher,

Inventor of 297 different kinds of Horseshoes; over one hundred different horses' feet. An artistic manikin of the foot and leg which can be taken apart and explained. Students received and graduated in season. Write for dates and terms.

Home Address, AKRON, O.

Trade Literature and Notes.

"NEW WAY" AIR COOLED easy starting engine 6 to 7 horse-power, is described for the first time in a 40 page booklet just issued by the "New Way" Motor Co., Lansing, Mich. Before buying an engine get a copy of this book, free, and read the advantages of this style machine. Address Air Cooler Motor Co., Lansing, Mich.

OUR READERS who are doing auto repair work will find it to their interests to get prices on auto tires from A. H. Kasner, 152 Church St., New York City. This firm offers to make special inducements to AMERICAN BLACKSMITH readers. Mr Kasner also has a fine stock of auto lamps at very low prices.

SUPERIOR BRAZING COMPOUND, a strictly high grade flux, is being used in large quantities by big manufacturing concerns, and it is said to produce excellent results in brazing. AMERICAN BLACKSMITH readers have quite a little brazing to do and should correspond with the manufacturers of this excellent compound. Address The Standard Carriage Lamp Co., 43–49 So. Canal St., Chicago, Ill.

THE W. P. DAVIS MACHINE COMPANY, OF ROCHESTER, N. Y. recently announced their removal to their new offices to No. 257 St. Paul street, Rochester, N. Y. We are advised that in these quarters The W. P. Davis Machine Company will carry a much larger stock of machine tools, engines, boilers, iron and wood working machinery and mill supplies, and the high quality of goods in all departments will be maintained.

ON PAGE SIX, The Standard Varnish Works, of New York City, announce a special proposition that they have for every body who does carriage and wagon painting. This concern is known as the largest Varnish works in the world and undoubtedly have an offer worth investigating. Write to this firm at once. It may be the means of your saving many a dollar. Address Standard Varnish Works, Dept. P., 29 Broadway, New York City, or 2620 Armour Ave., Chicago, Ill.

OUR READERS WERE MUCH GRIEVED to learn of the death of Mr. H. C. Weber, Superintendent of the Weber Gas Engine Company, Kansas City, Mo., Mr. Weber after many years of efficient service in gas engine construction died on January 21st at Phoenix, Arizona. For a number of years The Weber Gas Engine Company have been selling engines to American Blacksmith readers and the construction of these first class machines was under the supervision of Mr. H. C. Weber.

AMONG THE NEW ADVERTISERS, who joined our columns is the Tudor Mfg. Company of Worcester, Mass. This firm is offering to the trade a very practical and serviceable carriage and tire bolt ratchet wrench. The Tudor Mfg. Co. are also offering our readers a clamp that can be almost instantly adjusted and several other well made tools for "busy" people. See their advertisement on another page of this issue and write for descriptive circulars.

FOR A LONG TIME THE EAGLE ANVIL WORKS of Trenton, N. J. have been selling anvils and vises to our readers. Eagle anvils and vises leaving their factory bear the stamp "Fisher," and this is the only brand of anvils made at Trenton, N. J. Readers should bear this fact in mind and not get the Eagle anvil manufactured at Trenton, N. J. confused with other makes. The Eagle Anvil Works advise us that they have recently increased their plant and the demand for their goods is steadily increasing.

A STUDY OF THE ILLUSTRATION on page 24 will give a better idea of the manner in which the Root Grinder works than can be obtained by a volume of words. The makers claim that with the recent improvements they have brought the Grinder to a point as nearly perfection as can be attained. They maintain that for ease of operation; thoroughness with which the Ideal does the work intended; durability, it has no competitor, while the cost is very reasonable. Can be operated by hand or power, and used for sharpening skates, tools, etc.

A NEW COMPLETE CATALOGUE of over 250 pages has been issued by The Barlow Hardware Co., of Corry, Pa., describing a splendid line of blacksmiths and wagon makers tools supplies, etc. This firm has recently built up an enormous mail order business by adopting the policy, as they put it, of "giving you more goods and better value for your money, than any other house in the world." This catalogue is sent free to our readers on request. It contains many interesting prices you should see before buying. Write for a copy at once.

CRAY BROTHERS OF CLEVELAND, OHIO, have made many special propositions to our readers and these offers have very often helped our friends to save considerable money. Attention is called to the regular advertisements of this firm on page 25 each month.

Cray Brothers have just issued a 304 page catalog and a copy of this valuable booklet will be sent free to any American Blacksmith reader upon request. We advise our readers to write for a copy of this book.

IT WAS RECENTLY ANNOUNCED that the Dubois Iron Works of Dubois, Pa., have taken over the entire business of the Lazier Engine Mfg. Company of Buffalo, N. Y. Many improvements have recently been made in the Dubois Engines and the manufacturers claim this engine to be far in advance of any gas and gasoline engine now on the market. The head office and entire management of this firm will be located at Dubois, Pa. At Buffalo, which formerly was the Lazier Engine Mfg. Company's headquarters, a branch office will be retained together with branches in the principal cities throughout the country.

ONE OF THE BEST CATALOGUES this season has just been issued by The Silver Mfg. Co., Salem Ohio, who make blacksmiths and wagon makers tools and machinery. This firm has been in business for over fifty years. Their line embraces several distinctive features and all of their articles are standard makes, their merits and efficiency having been proven by years of practical use. The new catalogue shows a line more complete than ever, with many new machines. If interested in improving your equipment write and tell The Silver Mfg. Co. what machines you intend to buy and receive free their machinery catalogue.

THE PHOENIX HORSESHOE CO., of Chicago, Ill., have issued a valuable booklet describing their five complete lines of high grade horse and mule shoes, all styles and sizes. The attention of readers is called to the announcement of this firm on page 4 this issue. The Phoenix Horse Shoe Co. give greatest care to the manufacture of their shoes and have won highest recommendations from all users.

The booklet mentioned above also contains illustrations and interesting articles on ancient horseshoes. Write for a copy. It will be sent to you without charge.

THE INDUCTION COIL COMPANY, of Milwaukee, announces that, owing to a change in the personnel of said company, the corporate name will hereafter be Sherman-Lemke Coil & Supply Co.

Mr. M. W. Sherman will continue at the head of the new company as President and General Manager. Mr. O. H. Lemke will be Vice President and Superintendent of Construction. Mr. Lemke is an experienced coil maker and mechanician and electrician. The ability and experience of the members of the new firm and the extension of facilities for the manufacture of their product insure to their customers the best coils and most efficient service possible.

The Induction Coil Company solicits for the Sherman-Lemke Coil and Supply Co. a continuance of the patronage of its old customers and recommends them to the consideration of all users of jump spark coils.

LONG AGO our readers turned to Wells Bros. Co., Greenfield, Mass., for high grade screw cutting tools and machinery. Wells Bros. line has always been most complete and appreciated, because you can always rely on the quality of the "Little Giant" brand. The firm has just issued a new expensive catalogue describing many new tools and machines. The book is the finest of its kind and Wells Bros. offer to send it to our readers free on request. Special attention is called to the new assortments in single and full stocked screw plates, also the new horse shoe taps, spindle stay bolt taps, bolt cutters and nut tappers, ratchet and tap wrenches.

A NEW CORPORATION WAS RECENTLY FORMED in the State of New York called the H and Rowe Calk Company for the purpose of selling the calks recently placed on the market by the H Calk Company of New York City and the Rowe Patent Calk Co. of Hartford, Conn. The H calk is an all steel calk especially constructed from Krupp steel in Germany and is well known in Europe as well as by the American trade. The Rowe calk is one of the oldest calks made in this country, and the manufacturers claim that it is the best and longest wearing steel center calk ever turned out. The new company has the exclusive selling rights for these two calks and is officered by the officers of the two companies.

Both companies are preparing for a large increased business. The H Calk Co. is making arrangements for heavy importation from Germany and in Hartford, Conn., a new factory is being equipped to manufacture Rowe calks by a new process and in quantities to meet any possible demand.

PRACTICALLY every large modern wood working shop is nowadays equipped with an expensive automatic band saw sharpener, but the smaller users of band saws with one or two saws per week to sharpen, which would not warrant a large machine, are still pushing the hand file.

At each revolution of the file shaft the rotary file is automatically withdrawn from engagement with a tooth dropped back and just as the smooth portion of its circumference reaches the saw it shoves the saw along for the next tooth. The amount of this movement is regulated according to the size of the saw tooth by a thumb screw.

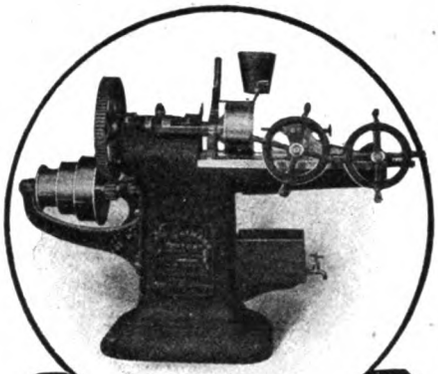
The file only cuts to a certain depth each time and this feature always insures accurate and even teeth.

The construction of the vise makes it possible for a thick weld and in fact almost anything but a brake to pass through the vise without stopping the machine or injuring a tooth.

This machine will save three-fourths or more of the time of hand filing because it is entirely automatic and only requires the time necessary to put in a saw and start the machines.

Full particulars and descriptive circulars can be had by addressing The Rotary File & Machine Co., 589 Kent Ave., Brooklyn, N. Y.

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FRONT VIEW

A Bolt Cutter is much like a man in this: THE HEAD is nearly everything.

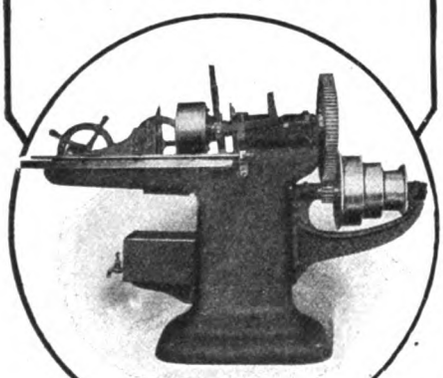
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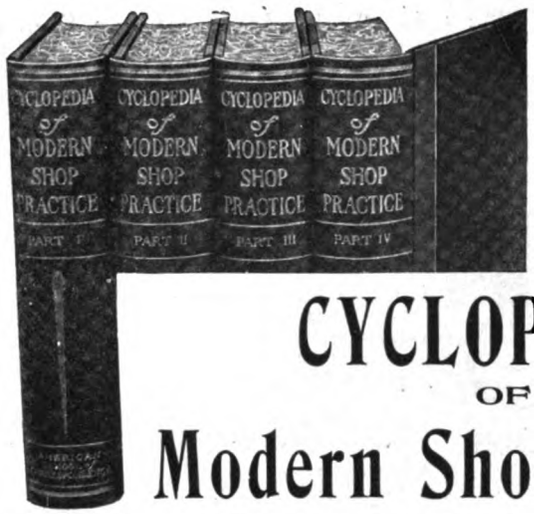
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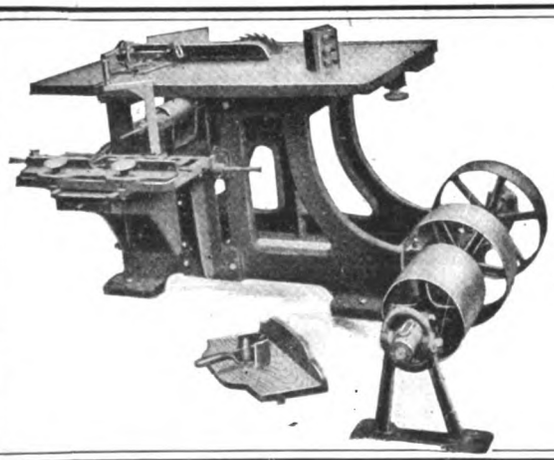
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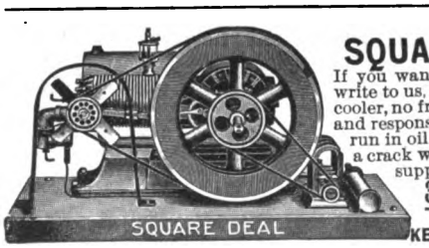
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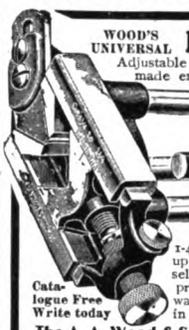
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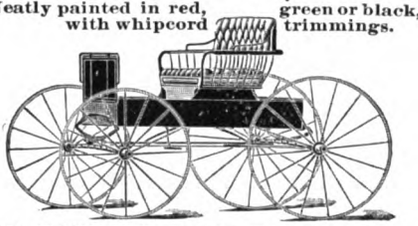
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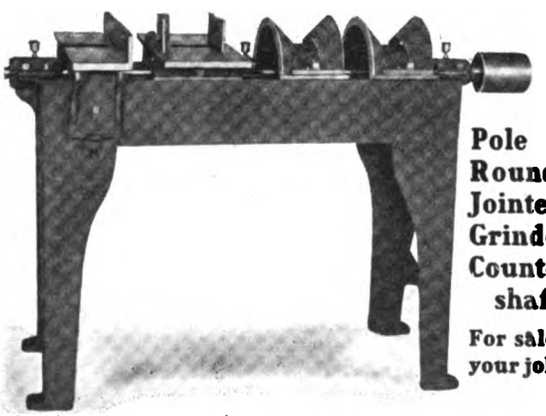


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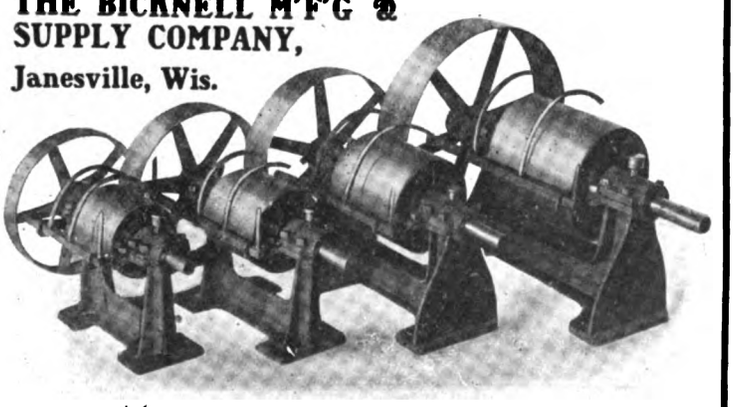


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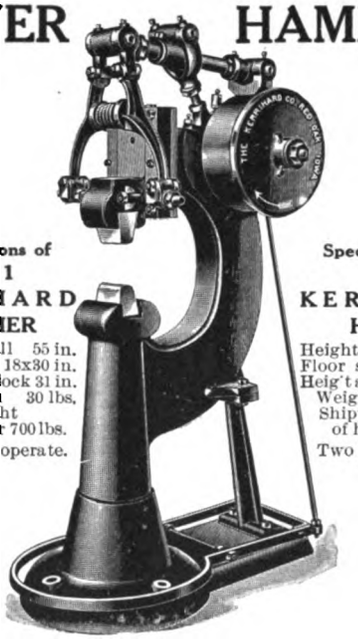
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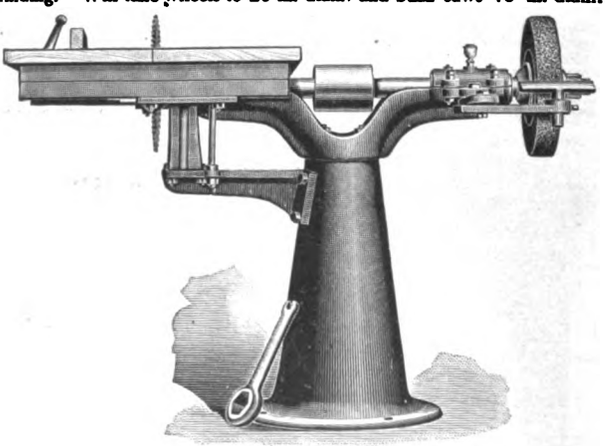
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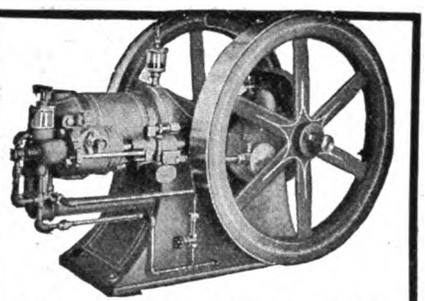


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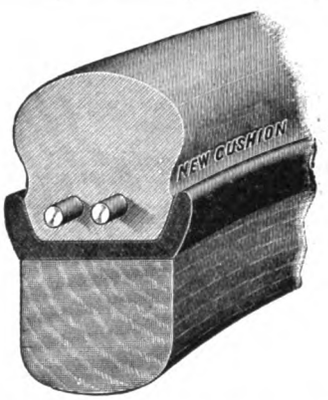


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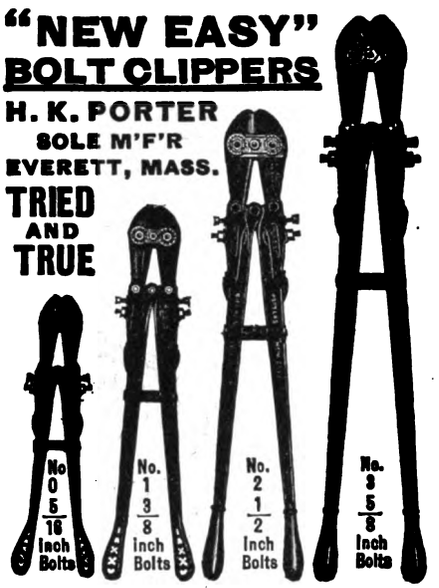
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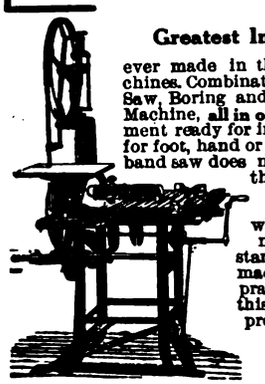
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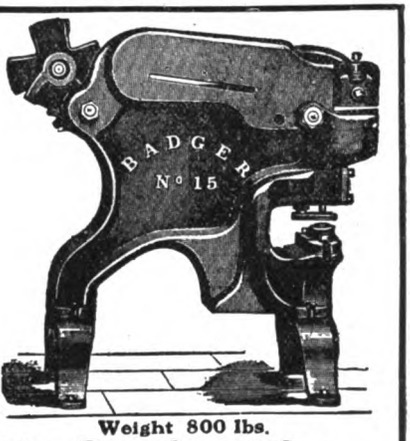
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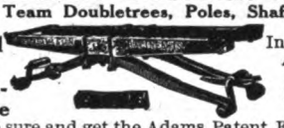
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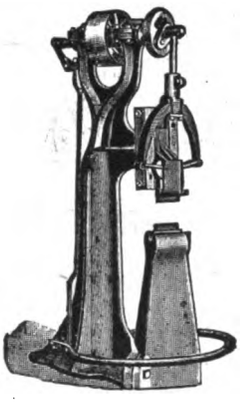
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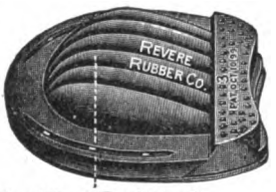
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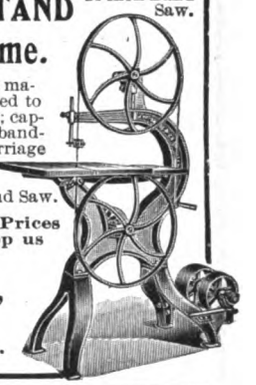
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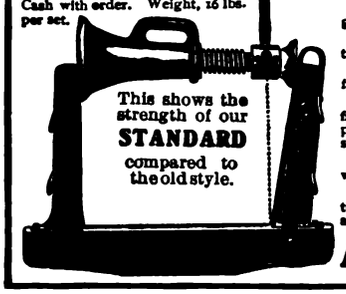


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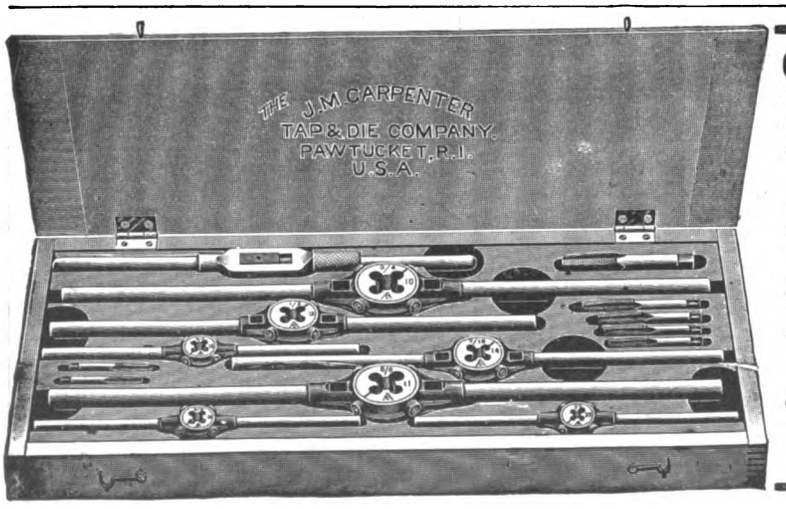


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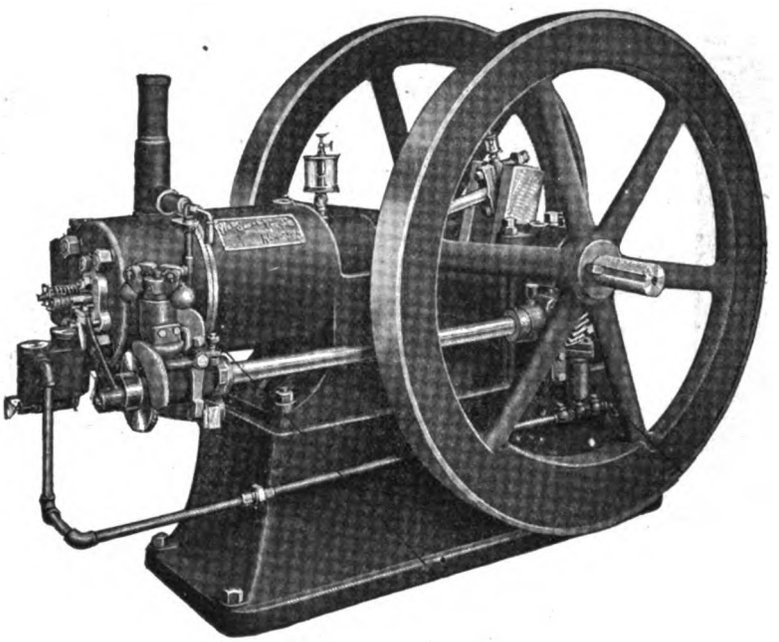
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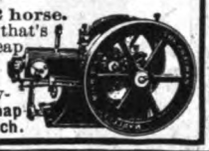
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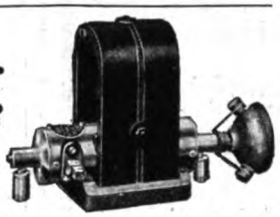
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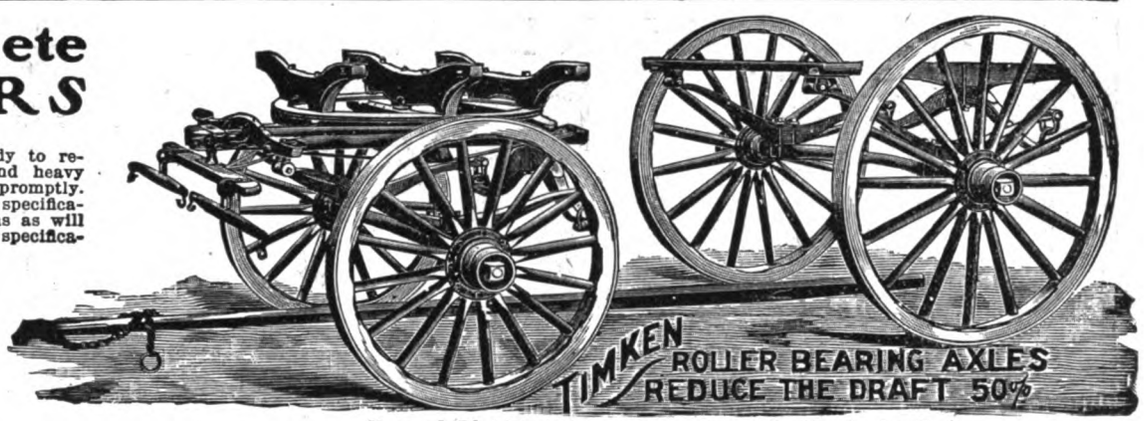
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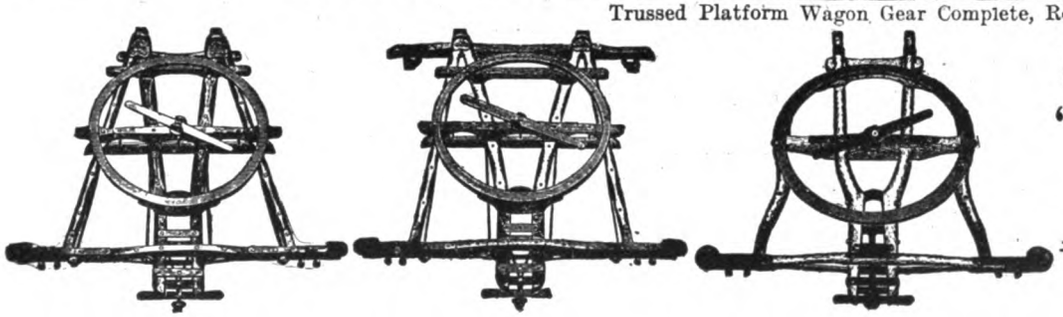
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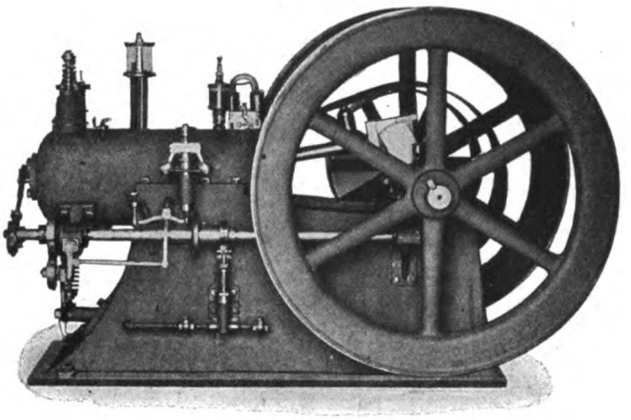
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Akron, Ohio, U. S. A.

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THE ANGOLA



Investigate Its Merits.

Easy and simple to operate; few parts; close regulation of speed; thorough system of lubrication; economical; reliable; safe; durable and strong. Just the engine you are looking for to make your shop life easy. All sizes—1½, 2, 4, 6, 12 and 15 H. P. Stationary and Portable.

OUR CATALOGUE IS FREE—WRITE. WE WANT AGENTS. GET OUR PROPOSITION.

THE ANGOLA ENGINE AND FOUNDRY CO.,
ANGOLA, INDIANA.

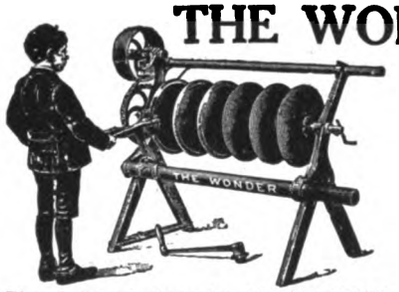
SAVE
The Dealer's Profits

BUY WHEELS DIRECT FROM THE FACTORY

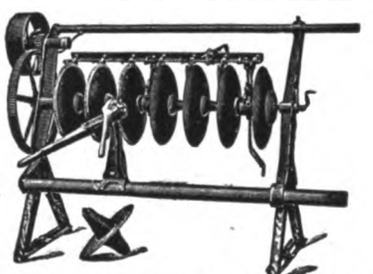
We can save you money on all sizes of wheels; in the white, painted any color and with steel or rubber tires. We bore wheels for boxes without extra charge. Give us a trial order and we will make you one of our many satisfied customers. Write for special prices to *American Blacksmith* readers.

Carriage Wheel Supply Co.
UNION CITY, IND.

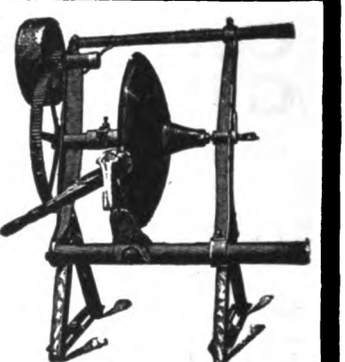
THE WONDER DISC SHARPENER



The above cut shows the LITTLE GIANT at work on a whole section of Discs. This machine is especially adapted for sharpening Disc Harrows.



The above cut shows the GIANT WONDER at work on a Seven Disc section.



The above cut shows the Giant Wonder at work on Disc Plows. Will sharpen any size from twelve to thirty-two inches in diamater.

January 1st, 1907, finds the Wonder Disc Sharpener at work in twenty-four States, Canada and Mexico.

The only Sharpener made adjustable to all conditions. Can shear any part of edge to any bevel. Can shear back from edge as far as necessary. Can use tool on either side of disc. Can shift from one disc to another. Can do all this without the turn of a set screw or nut, is a positive feed, automatically adjusts itself to wobbling or bent discs. Knives made of best grade of self tempering tool steel, will last a life time.

WISCONSIN—Dear Sir: I received your Wonder Disc Sharpener and have given it a thorough trial. Am more than pleased with it. I find that it not only sharpens, but makes the edge true and uniform like new. It is well-named, The Wonder.
Yours truly, I. G. STONE, Milton Junction.

KANSAS—A. E. Durner: This is to certify that I have been using the Giant Wonder Disc Sharpener for some time, and that I find it to be a Wonder sure. As I have used most all makes of sharpeners including the roller sharpeners, and I find to my own satisfaction that the Giant Wonder leads them all for quick and uniform work. I would not take four times the cost and be without the Wonder Disc Sharpener. Success to the Wonder.
Yours respectfully, E. B. NYE, Oketo.

IOWA—A. E. Durner: I bought one of your Wonder Disc Sharpeners last spring, and can truly say that it is the best machine I have ever used for sharpening discs. Yours truly,
JOHN T. CHANDLER, Low Moor.

SOUTH DAKOTA—A. E. Durner: I bought one of your Wonder Disc Sharpeners and found it O. K. and would advise any blacksmith in need of a Disc Sharpener by all means buy the Wonder as they will surely be satisfied.
Yours truly, J. W. IMPECOVEN, Kidder, S. Dak.

TEXAS—Dear Sir: I wish to say that the Wonder Disc Sharpener I bought this spring is O. K. It works well and is well worth the price. I am well pleased with it. Resp'y. A. F. BALL.

MISSOURI—Mr. Durner: I have one of your Wonder Disc Sharpeners. I think that it is what it is represented to be. I use my sharpener by hand power and it has proven, so far, to be the best I have ever used and am well pleased with it. Respectfully,
FRED WALKER, Duncansbridge.

MISSISSIPPI—A. E. Durner: We wish to say that the Little Wonder Disc Sharpener we bought of Adams Neubert of Okolona, is all right and giving good satisfaction. We are well pleased with it. Respectfully,
TRICE & RADER, Okolona.

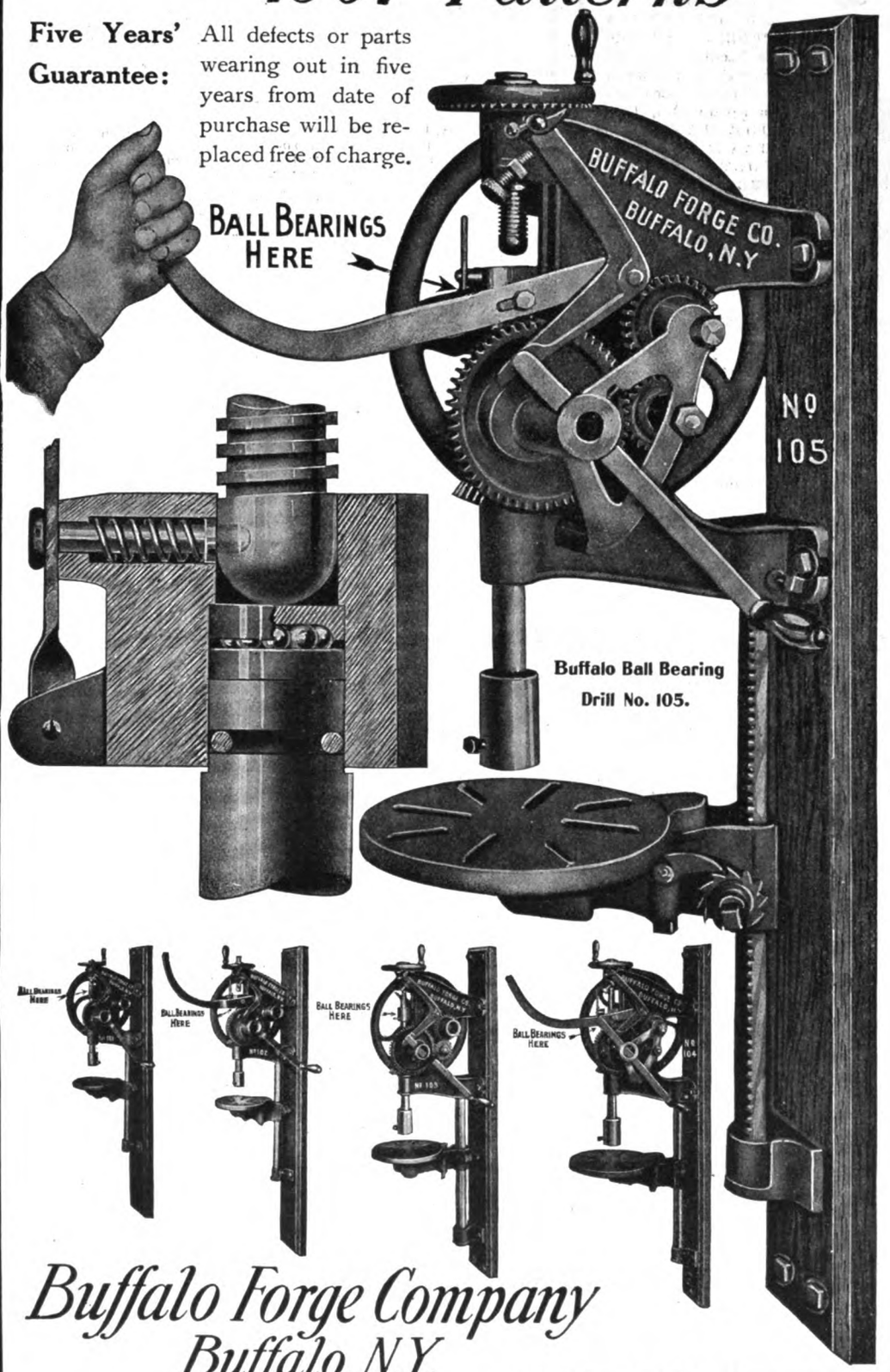
WRITE TODAY FOR CIRCULAR.

A. E. DURNER, Evansville, Wis.

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Buffalo Ball Bearing Drills
1907 Patterns

Five Years' Guarantee: All defects or parts wearing out in five years from date of purchase will be replaced free of charge.



Buffalo Ball Bearing Drill No. 105.

BUFFALO 1907 DRILLS.

5 Sizes
5 Capacities
5 Prices
Send for Photographs

Designs are
New
Strong
Simple
Durable
Original
Jig Made
Practical
Symmetrical
Extra Heavy

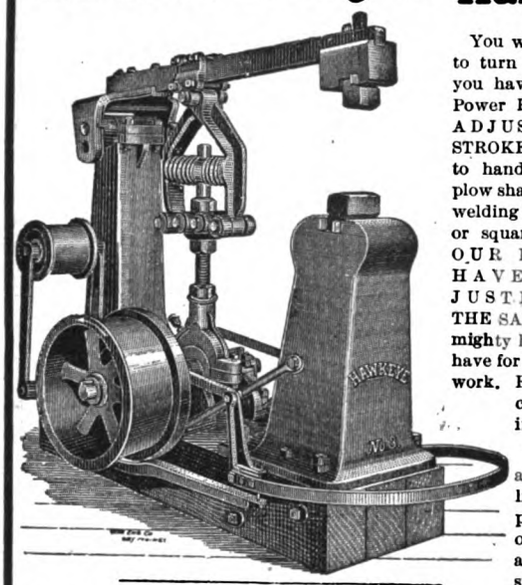
Features:
Two Speeds
Lever Feed
Quick Return
Slotted Table
Ball - Bearings where they count, on the high speed spindle, ***not*** on the slowly rotating feed mechanism.
No Lock-Nuts to take the thrust – Buffalo 1907 Drills are free from these by-gones.
Pin Clutch; Nut Closing Devices avoided.
Combination Lock - Nut, Ball - Bearing & Pin Clutch.
Bearings ***bored*** and ***reamed*** in solid metal, no liners used.

Buffalo Forge Company
Buffalo, N.Y.

Canadian Buffalo Forge Co., Montreal, Canada.

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Hawkeye Power Hammers

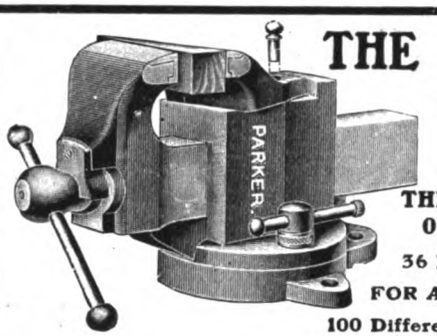


You will never need to turn a job away if you have a Hawkeye Power Hammer. NO ADJUSTMENT OF STROKE REQUIRED to handle work from plow sharpening up to welding 2½-inch round or square steel, BUT OUR HAMMERS HAVE THE ADJUSTMENT JUST THE SAME, and it is a mighty handy thing to have for extraordinary work. REMEMBER it costs you nothing extra.

These features alone make our hammers superior to all others. They are built in two sizes to meet the requirements of both large and small shops. **One h. p. runs either.** For prices and full description address

Pat. in United States, Sept, 29, 1903; in Canada, Feb, 21, 1903.

The Hawkeye Mfg. Co.
CEDAR RAPIDS, IOWA



THE PARKER VISES

THE MOST RELIABLE ON THE MARKET

36 Different Styles, FOR ALL PURPOSES, 100 Different Sizes.

Parker vises will be found in the best equipped shops in the country. No other vise has given to the trade such general satisfaction. Our new line of improved vises has reinforced sliding jaws, making the Parker vises stronger and more durable than ever.

Made of a blending of steel and best iron in the castings.

The steel faces on these vises are milled and fitted to the jaws and are removable. Have self-adjusting back jaws which automatically adapt themselves for holding wedge-shaped pieces.

STRONG DURABLE HANDY

Our complete illustrated catalogue is free. Write today for price list also.

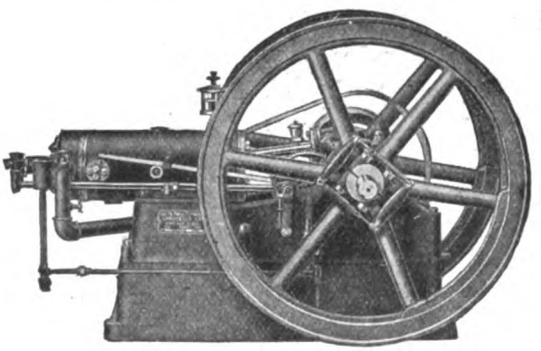


A tool of many uses. Both round and pipe jaws interchangeable. Weight, 76 lbs.

THE CHAS. PARKER CO.,
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JUST THE POWER FOR A BLACKSMITH

The question of power is getting to be an important one for the modern up-to-date blacksmith. In his modern up-to-date shop, he needs a good, reliable power many times a day.



But as a rule, he doesn't want to use this power continuously throughout any one day; therefore, an engine which may be started quickly, run at maximum efficiency for a short time or long, as the case may be, and stopped as quickly as started without waste of fuel, is the only engine suited to his needs.

I. H. C. gasoline engines are such engines. Simple in construction, they are not liable to get out of order, hence are always ready and are easiest of all to operate. No trouble to start them and no waste of fuel---simply close the switch, open the fuel valve and give the fly-wheel a turn or two by hand.

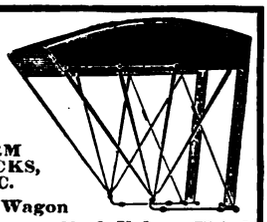
And I. H. C. gasoline engines are built right for economy, too. Ordinary stove gasoline is the fuel they use, though they are also adapted for the use of gas or alcohol.

They are made in a variety of styles,---Vertical and Horizontal, the latter both portable and stationary, in sizes ranging from 2 to 20-horse power. Call on the local International Agent or write for catalog.

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BUGGY AND AUTO TOPS, DASHES, STORM APRONS, BACKS, CUSHIONS, ETC.

Poles, Shafts, Wagon Singletrees, Eveners, Neck Yokes, Third Seats, Anti-Rattlers, Harness Goods, Etc.

Order a sample of our $6.00 Heavy Rubber Top.

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HELLERS' CELEBRATED AMERICAN HORSE RASPS FILES AND FARRIER'S TOOLS

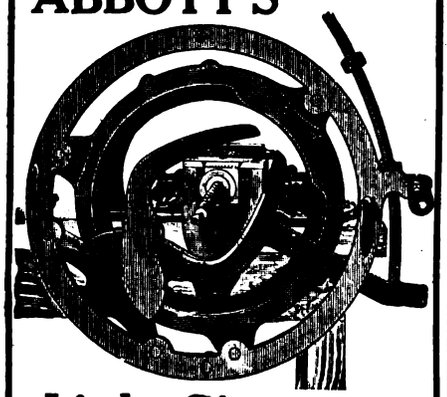
will save you Time and Money. Their Superior Quality sets a known and tested Standard of Excellence. All made from our own Production of Special Refined Clay Crucible Steel and tempered by a Secret Process. New Catalogue Mailed Free on Application.



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Made by ABBOTT & CO., Hudson, Mich., and sold by all Dealers in Carriage Makers' Machinery.

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You get "value received" when you buy "F. S." Ready-Mixed Carriage Paints. May we send you samples?

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Manufacturers of Colors, Paints, Varnishes
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The Vulcan for Tuyere Iron Has No Equal

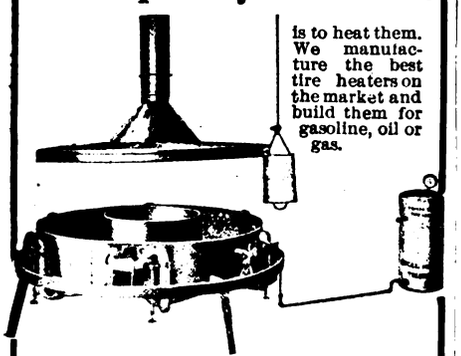


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is to heat them. We manufacture the best tire heaters on the market and build them for gasoline, oil or gas.

ASK YOUR DEALER

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Made in 3 sizes.

Only one horse-power to run it. The best Trip Hammer in the U. S., by reason of its simple construction, efficiency and durability. Used exclusively by some of the largest carriage builders in the country.

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are the best for Foundry use and Tool grinding. Cool, free and fast cutting." Made of highest grade Corundum obtainable. Every user of a Pike Corundum Wheel is insured against accident by the Casualty Company of America. **Send for new illustrated Catalog.**

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For Vehicles of all kinds with STEEL OR RUBBER TIRE.
Have a record of excellency for seventeen years.

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TOP BUGGIES, $30.00
RUNABOUTS, $32.00
Cushion Backs, Storm Fronts, Poles & Shafts.
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WITH 4-IN. TIRE STEEL WHEELS

Our wagons are well ironed throughout—wheels made with round staggered spokes.



We make any size wheels to fit any skein.
We manufacture a complete line of metal wheels for corn planters, cultivators, plows, etc.
WRITE TO **C. BUSH, QUINCY, ILL.**
(MENTION THIS PAPER.)

A Good Engine at a Low Price



5 H. P. Air Cooled

No troublesome water jacket.
No engine ever before constructed with so few working parts.

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AIR COOLED MOTOR CO.
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"CHICAGO" EMERY WHEELS CUT QUICK

A wheel that will do the work in one-fourth to one-half less time is by far the cheapest in the long run. A wheel that will save only one hour per day during your busy season would pay for itself in full.

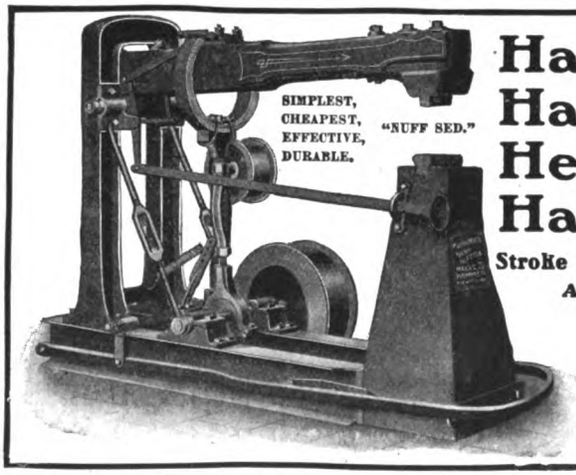




NATIONAL SAFETY SHORT-TURNING FIFTH WHEELS

have been on the market for over **TEN YEARS** and used by good Carriage Builders everywhere. Ask your dealer for them. If he can't supply you, **write for catalogue** showing all our different styles.

National Safety Fifth Wheel Co.,
LANCASTER, PA.



Hathorn's Hard-hitting Helve Hammer.

Stroke adjustable while running.

Ask your Dealer or write to
HATHORN FOUNDRY & MACHINE CO.
1206 N. 71st Ave.
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"CHICAGO" WHEELS SAVE TIME

They're made of stuff that cuts

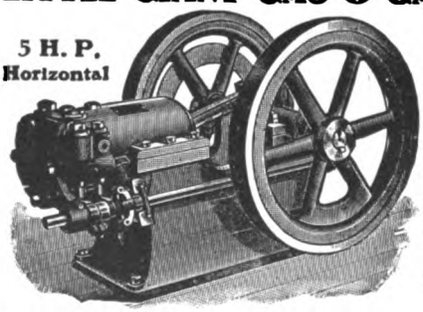
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136 Page Catalogue for the Asking

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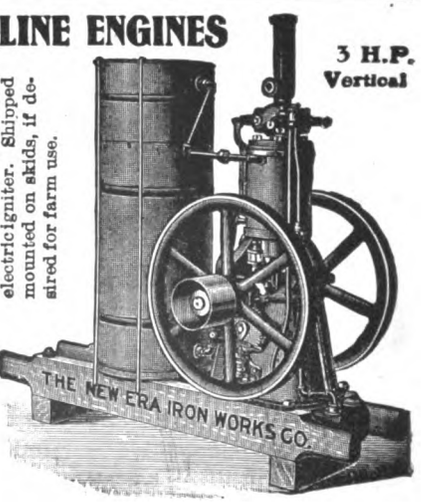
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5 H. P. Horizontal



Sizes, 1½, 3, 4½ H. P. Vertical. 5 to 25 H. P. Horizontal. **Either tube igniter or** electric igniter. Shipped mounted on skids, if desired for farm use.

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Also equipped with pumping attachments. **Write for booklet describing full line New Era Gas Engines from 8 to 100 H. P. Special inducements to dealers as agents.**

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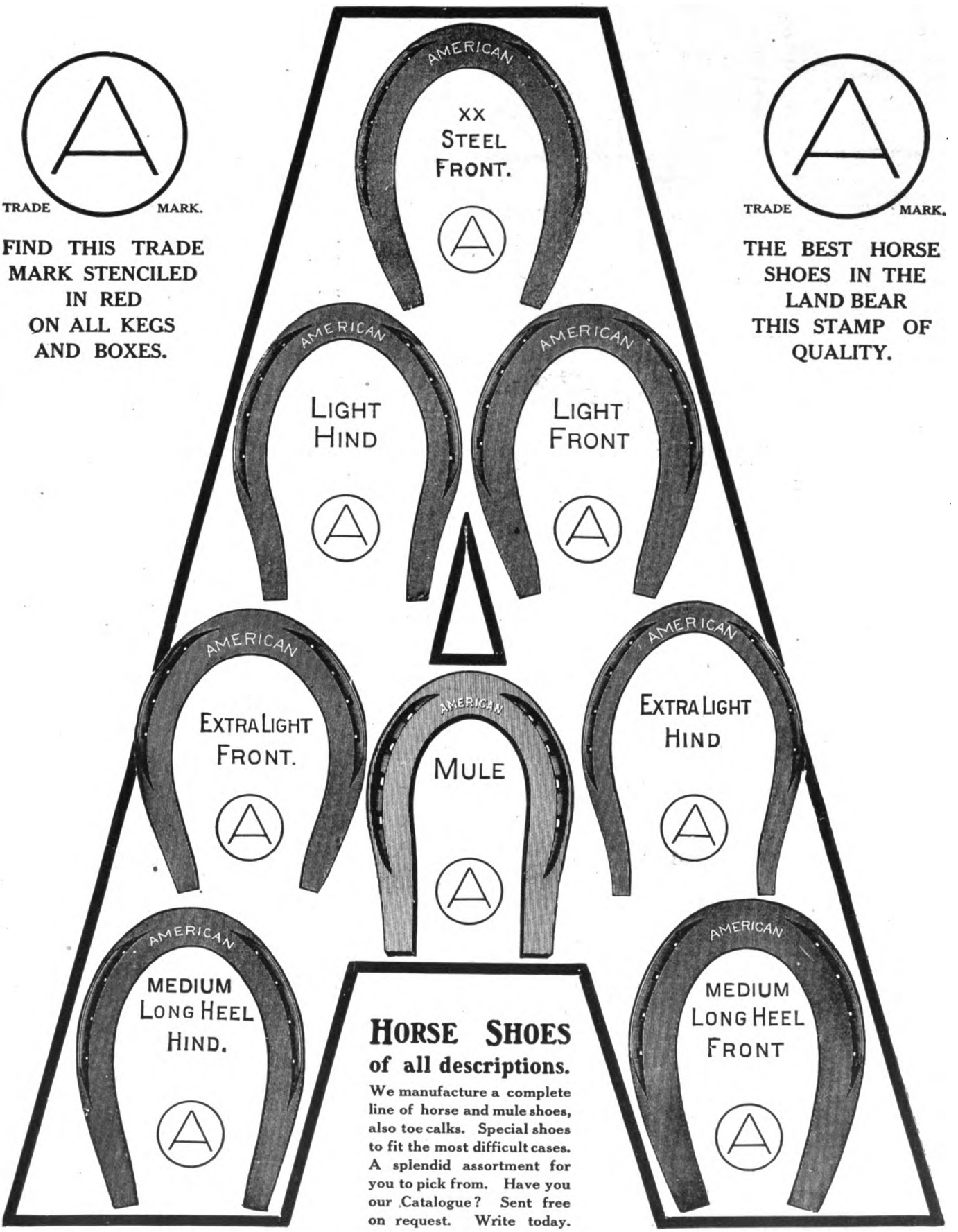
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HORSE SHOES
of all descriptions.

We manufacture a complete line of horse and mule shoes, also toe calks. Special shoes to fit the most difficult cases. A splendid assortment for you to pick from. Have you our Catalogue? Sent free on request. Write today.

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ALL SIZES
GET OUR PROPOSITION
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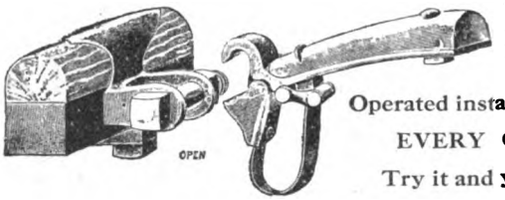
CASH Always Secures BARGAINS and ALWAYS WILL

Special Net Price on Sarven Patent Wheels (C. B. 50c. extra) with steel and rubber tire

Size of tread	Price per set for wheels with flat steel tire on and hubs bored	Price per set for wheels complete with channel and rubber tire on, and hubs bored. 36 and 40	38 and 40	40 and 44	Add to price of wheels for axles and boxes set
3/4	$6.25	$13.20	$13.40	$13.60	$1.90 L.D.
7/8	6.50	14.50	14.80	15.10	1.90 "
1	6.75	16.00	16.30	16.60	2.10 "
1 1/8	8.25	24.00	24.75	25.50	2.25 H.P.

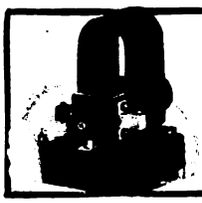
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Prompt shipments.
Five sets or more, one order you can deduct 25c. per set as freight allowance. Write for catalogue. We manufacture wheels with Steel or Rubber Tire on 3-4 to 4 inch tread. Buggy Gears with wheels and shaft all ready for body, $16.50
The A. Boob Wheel Co., Cincinnati, Ohio. U. S. A.

OVER 1,000,000 STANDARD COUPLERS
SOLD DURING THE PAST FOUR YEARS



Used with regular shaft shackle.
Fits any size bolt perfectly.
No loose bushings.
Operated instantly. Perfectly made.
EVERY COUPLER WARRANTED.
Try it and you will never use any other.

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Send for our new catalog containing over 400 devices used by the carriage trade.



HIGHEST GRADE
Ignition Generators do away with EXPENSE and TROUBLE of batteries. Can be easily installed with any engine and is very simple. This Magneto regulates its own speed and furnishes constant spark at all times. INFORMATION ON REQUEST.
REMY ELECTRIC CO., ANDERSON, IND.

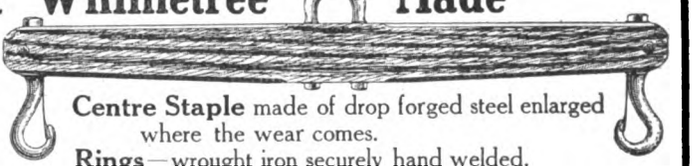


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They Never Fail to Please
BUCKEYE PAINT & VARNISH CO.
TOLEDO, O.

Strongest Whiffletree Made

With Patent Spring Hooks



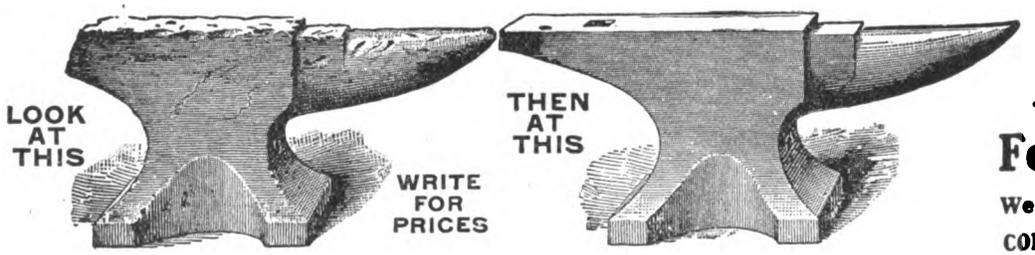


Centre Staple made of drop forged steel enlarged where the wear comes.
Rings—wrought iron securely hand welded.

Patent Spring Hooks fit any square or round end whiffletree. Ask your dealer for the A. M. W. line, or write for descriptive circular and price list.

A. M. WOOD CO.,
51 Beverly St. BOSTON, MASS.

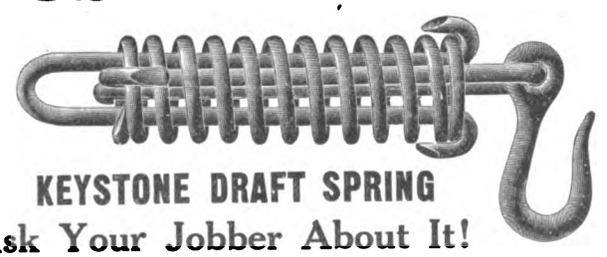
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COLUMBUS, OHIO.

WE ARE EXPERTS AT REPAIRING OLD WROUGHT ANVILS.
WE ALSO MANUFACTURE THE CELEBRATED ARM AND HAMMER BRAND ANVIL. ASK YOUR DEALER FOR THEM.

- USE HORSE SENSE -



KEYSTONE DRAFT SPRING
Ask Your Jobber About It!
MANUFACTURED BY
RAYMOND MANUFACTURING CO., Ltd.
CORRY, PENNSYLVANIA

THE KEYSTONE TRACE OR DRAFT SPRING RELIEVES THE HORSE OF ALL THOSE JARS CAUSED BY THE UNEVENNESS OF THE ROAD AND WHEN TAXED TO ITS FULLEST CAPACITY SIMPLY CLOSES, THUS FURNISHING A SOLID CONNECTING LINK AND AVOIDING ALL POSSIBILITY OF BREAKAGE.
LOOK INTO IT!

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COATES ELECTRIC CLIPPER

Clip your horse and sharpen his toe calks with the same machine. Move the light clipper around, no need to move the horse. You should know all about **Coates Flexible Shaft Machine.**

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COATES CLIPPER MANF'G CO.,
WORCESTER, MASS.

HAND MADE TOP BUGGY $55



119 Special.

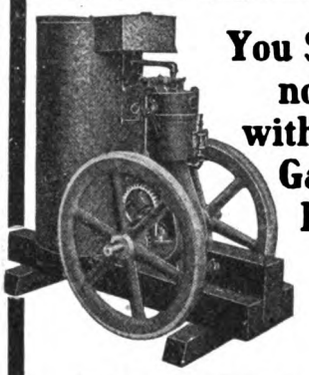
Long Distance Axles, Bradley Couplings, Full Rubber Top, Wide Seat, Heavy Trimmings.

No better wagon was ever built for the money. It is strong and durable, beautifully finished and worth $75.

WE SEND IT ON 30 DAYS FREE TRIAL.

Send postal card for our **Free Carriage CATALOG**, with over 70 different styles, and Wholesale Price List.

ROCHESTER VEHICLE CO.
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ROCHESTER, - NEW YORK.



You Should not be without a Gasoline Engine

4 and 6 H. P.

The **"Cray Bros."** Gasoline Engine has been proven by test to be **the most powerful and durable** on the market.

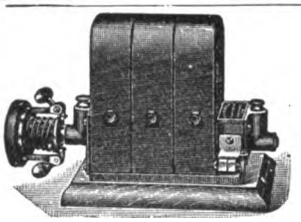
The mechanism is **simplified** as much as possible, and at the same time is made **strong and serviceable,** capable of performing **wonderful feats.**

The price? About **one-half** what others charge for engines of same horse-power.

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Send for our FREE 1907 304 PAGE CATALOG.

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CLEVELAND, OHIO



HENRICKS MAGNETO

Fires your gas or gasoline engine without the aid of batteries.

It is better and more durable than any Dynamo. Its Governor regulates the speed regardless of speed of Fly Wheel. Its Governor adjusts to imperfect Fly Wheels. Its Governor insures a constant and uniform spark. The spark does not burn the contacts of the engine. All strains are removed from the bearings of Magneto. FULLY GUARANTEED. AGENTS WANTED.

HENRICKS NOVELTY CO.
130 S. Capital Avenue *INDIANAPOLIS, IND.*

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IN THE FIRST DEGREE!!

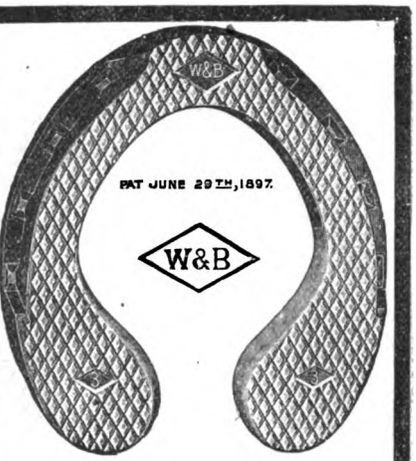
This 2½ H. P. Gasoline Engine

That we will sell for a limited time for $48.50 is worth and sold by anyone for $125.00. This is really murdering everybody's price. The engine is furnished complete on skids ready to run.

Second Degree Prices on the 3¾, 5, 6, 8, 10 H. P.

Get next quick.

C. A. DISSINGER & BRO., WRIGHTSVILLE, YORK CO. PA.



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uses "W. & B." Rubber Pad Horse Shoes because he makes a good margin of profit and the shoes please his customers.

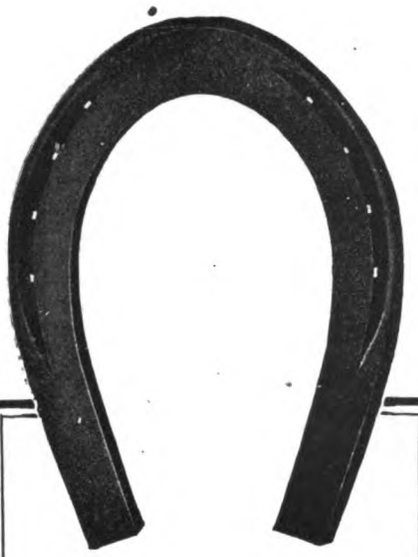
The "W. & B." Rubber Pad Horse Shoe is the only successful Pad Shoe made and its value to the horse is best shown by the fact that thousands of horse owners use them.

Sold by all the principal Blacksmith Supply and Heavy Hardware Houses.

If your Jobber does not carry them, write us.

THE WHITMAN & BARNES MFG. CO.,
General Sales Office
CHICAGO, ILL.

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WHEN YOU BUY HORSE SHOES

Is it not preferable to make your selection from the most complete line and the best shoes on the market?

UNITED STATES HORSE SHOES

"In a Class by Themselves"

OUR Illustrated Catalogue shows all sizes and patterns. The book is free. We will gladly send a copy to your address. Write today

We are giving away a handsome souvenir stick pin to every smith who sends his name and address. Did you get one? Don't wait until they are gone. Write today.

UNITED STATES HORSE SHOES
— ARE SOLD BY —
LEADING JOBBERS EVERYWHERE

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ROLLING MILLS and FACTORY

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S. N. BROWN & CO.,
DAYTON, O.

ECLIPSE

GAS AND GASOLINE ENGINES.

Vertical 2, 3, 4, 5, H. P.
Horizontal 5, 10, 12, 15, 20, 25, H. P.
Designed and Built for BUSINESS.
Catalogue on request. . . . . .

MYRICK MACHINE CO., Olean, N.Y.

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Electric Blower

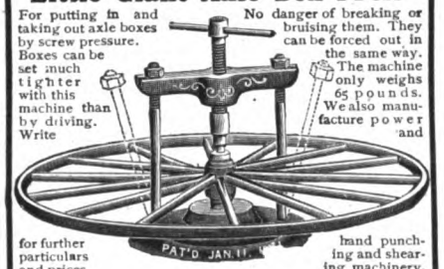
Direct connected, has been designed especially for the blacksmith and it is his ever ready helper that works for less than five cents per day.
It never tires. It places him on equal footing with the largest steam shops and allows him to work at the anvil steadily while electrically heating his work.

Write for circular and particulars.

NEW ERA ELECTRIC CO.

942 W. Lake St. CHICAGO.

Little Giant Axle Box Press



For putting in and taking out axle boxes by screw pressure. Boxes can be set much tighter with this machine than by driving. Write

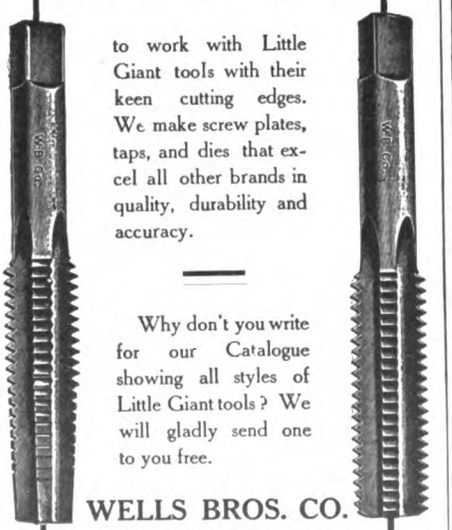
No danger of breaking or bruising them. They can be forced out in the same way. The machine only weighs 65 pounds. We also manufacture power and hand punching and shearing machinery.

for further particulars and prices.

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906 Summit St., Toledo, O.

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IT'S A PLEASURE



to work with Little Giant tools with their keen cutting edges. We make screw plates, taps, and dies that excel all other brands in quality, durability and accuracy.

Why don't you write for our Catalogue showing all styles of Little Giant tools? We will gladly send one to you free.

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New York Store, 56 Reade St. London Store 149 Queen Victoria St.

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30 DAYS ON THIS "Woodpecker"



AN ENGINE THAT WORKS

An ideal power for the shop man. Perfectly simple and never any trouble to make it run. Try till you know. Ship it back if you have any kick; no harm, no expense. Uses alcohol or gasoline. 3½, 7, 14 h.p. A selling plan that's fair and square. Write and let us tell you.

WOODPECKER 4th St Office, Middletown, Ohio.

HIGH-GRADE BUGGIES

$47.50 AND UP. Dealers Only.



Strictly First-Class Material.

JAMES & MEYER BUGGY CO.
Write for Catalog and Prices. **Lawrenceburg, Ind.**

MARVEL COMBINED SHEAR & PUNCH



Made of Malleable Iron
Blades, Punches & Dies Made of Best Tool Steel
With or without legs.
Cuts ⅛ x 2 in. Flat ¼ to ¾ in. Round Punches ⅜ in. hole in ⅜ in. stock; ½ in. hole in ¼ in. stock.

Write for Circular describing this machine also our New I Beam Punch and Splitting Shear.

ARMSTRONG-BLUM MFG. CO.,
107 N. Francisco Ave. CHICAGO, U.S.A.





"The world's standard for efficiency"

BADGER GASOLINE ENGINES Turn Time Into Money

Badger Engines enable the blacksmith to make the most money out of his time by enabling him to do more, better and a greater variety of work, and at the same time employ less help—saving cost of helpers.

The **"Badger"** stands for superior excellence and efficiency the world over.

Badger Engines are easy to start and to keep going; cost almost nothing for repairs and last a life-time. They are as cheap as is consistent with best skilled workmanship.

Send at once for our **Fine Book, Illustrated in colors**—It's FREE. It tells all about **Badger** Gasoline Engines, and why they are the best on earth for the Blacksmith. Write today, before the books are gone.

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Write for attractive terms.

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BUFFALO NO. 660 PORTABLE DOWN DRAFT FORGE

NOTHING TO WEAR OUT **THE FUEL SAVER** **NO SMOKE**

GUARANTEED FOR FIVE YEARS

Any parts of Buffalo No. 200 Blower attached to this Forge, wearing out in five years, will be replaced free of charge. This Blower is positively guaranteed to produce a stronger, more powerful blast than any other blower in the world.

FIGURES DON'T LIE!

Average Yearly Cost for Fuel, Old Style Forge, - -	$55.00
Average Yearly Cost for Fuel, Buffalo No. 660 Forge, - -	36.67
YOU SAVE, PER FIRE, EACH YEAR, -	18.33

— HOW IT WORKS —

On turning the crank of the powerful No. 200 Buffalo Hand Blower, all smoke and gases are drawn into the stack by means of the draft produced by a connection to fan case. The larger part escapes up the stack by reason of the natural and induced draft, while a portion passes through the fan into tuyere. A separate connection from blast pipe into stack strengthens the natural draft and is of great service when fire is started.



BUFFALO NO. 660 PORTABLE DOWN DRAFT FORGE—CAST IRON HEARTH.

Cast iron hood. No rusting out. Tile stack indestructible from heat, rust and gases.

SOLD BY BEST DEALERS THROUGHOUT ENTIRE WORLD

Send for our complete Catalog, showing 250 styles and sizes.

"A FORGE FOR EVERY TRADE."

Have one placed in your shop on 30 day's free trial, If you buy before July 1st, we will send you check for 10 per cent rebate of the price.

ALL SMOKE, GASES, FUMES AND CINDERS ABSOLUTELY DONE AWAY WITH. NO SMOKY SHOPS.

In setting up, use one length of tile in the smoke pipe and the outfit will last a lifetime with no repairs.

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Write For Catalogue and Prices.

Export Work our Specialty.

TOPS FROM $4.40 UP.

INDIANA TOP & VEHICLE CO., Lawrenceburg, Indiana, U. S. A.

"The Australasian Coachbuilder & Wheelwright."

A Monthly Illustrated Technical Journal circulating amongst Coachbuilders, Wheelwrights and Blacksmiths throughout the Commonwealth of Australia, New Zealand and South Africa.

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65 MARKET STREET,

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A BIKE RUNABOUT FOR $25.00

less than you can buy a similar style from certain high-grade builders, upon whose work dealers cannot make the same percent profit as on ours.



Our Catalog of 175 Styles Mailed upon Request.

Write us before you buy elsewhere, even for something you have selected from some other catalog.

If you will only write us, we will name you a price so low for the exact same style that, to save money, you will either buy of us or our competitor will be compelled to sell you his vehicles for much less money than he otherwise would.

Rubber Tires $7.00 and up.

The Barnett Carriage Co.

20,000 VEHICLES ANNUALLY Cincinnati, Ohio

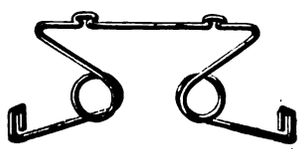
KING TONGUE SUPPORT

Fits any Farm Wagon.



The only COIL tongue spring that can be attached without removing queen bolt

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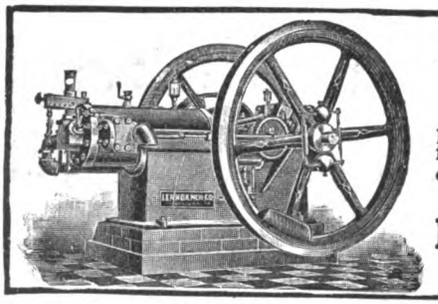


1,000 lbs. capacity per pair. Only four bolts required to attach

Write today for prices.

Racine Economy Spring Co.

Racine, Wis.



Lennox Gasoline Engines

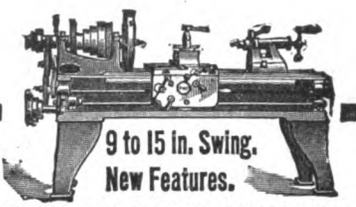
MADE IN ALL SIZES.

Built especially for Blacksmith shop power. It means money in your pocket to find out about our engines before placing your order.

WRITE AT ONCE FOR NEW FREE CATALOGUE.

Lennox Machine Company,

110 9th Ave., MARSHALLTOWN, IA.



9 to 15 in. Swing. New Features.

SEBASTIAN LATHES are Good Lathes

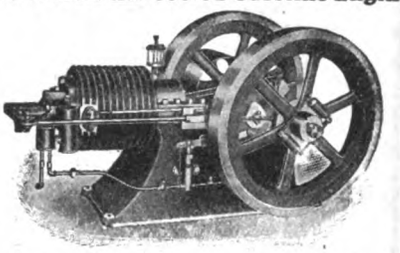
Catalogue Free. Sizes 9, 10, 13, 15 Inches.

Our engine lathes are provided with both screw and rod feeds as well as power cross feed. Gears to cut all standard threads from 5 to 36 are furnished. Steady and follower rests, large and small face plates and countershaft go with each Lathe. Foot Lathes, Tools and Supplies.

SEBASTIAN LATHE CO.

124-126 Culvert Street, CINCINNATI, OHIO.

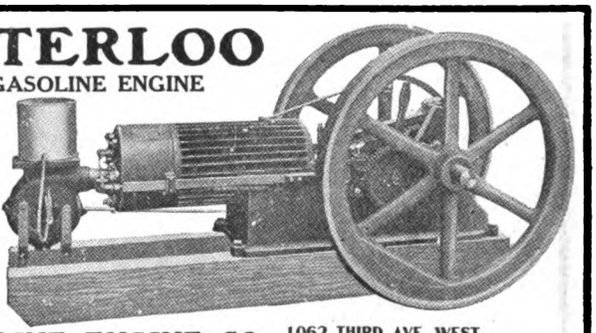
The GADE Air Cooled Gasoline Engines



Made in 2, 3 and 6 horse power sizes. What's the use of paying good money for an old style engine, when you can get something better in the "Gade Air Cooled" at the same cost Buy one. It will not freeze up or go back on you in cold weather. It's ready for business all the time. We know it will please. By all means write for descriptive circulars and price list of the "Gade." Address. GADE MFG. CO., Iowa Falls, Iowa.

THE WATERLOO

VAPOR COOLED GASOLINE ENGINE



The Only Vapor Cooled Engine in the World.

Positively frost proof and cannot freeze. The King of all Gasoline Engines. Our illustrated Catalog will tell you all about it.

WATERLOO GASOLINE ENGINE CO. 1062 THIRD AVE. WEST, WATERLOO, IOWA.



Will turn off blue chips on any kind of work.

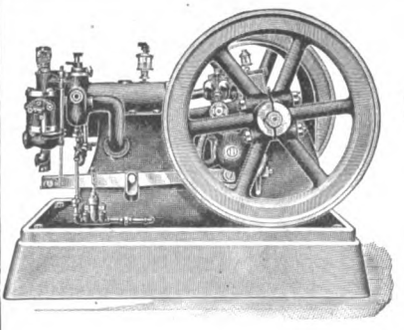
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GET TO KNOW THE ALAMO GASOLINE ENGINE

The ideal power for shop or farm. Economical of fuel. Easy to start. Speed regulated while in motion. Built on advanced lines. Satisfactory wherever installed. Send today for Catalog A—FREE—full of information.

ALAMO MFG. CO.,

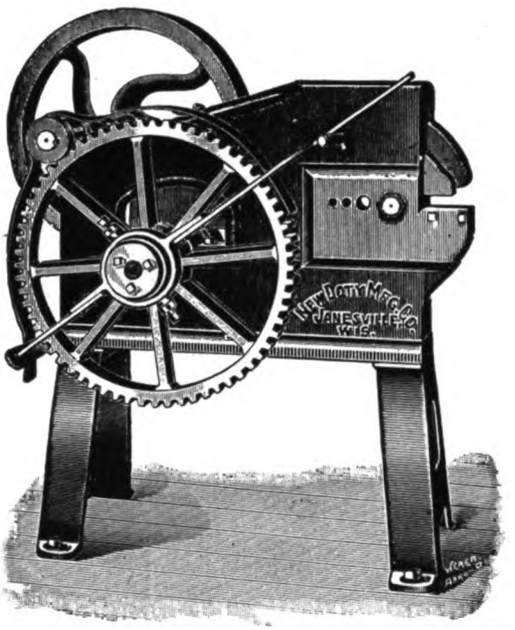
HILLSDALE, MICH.

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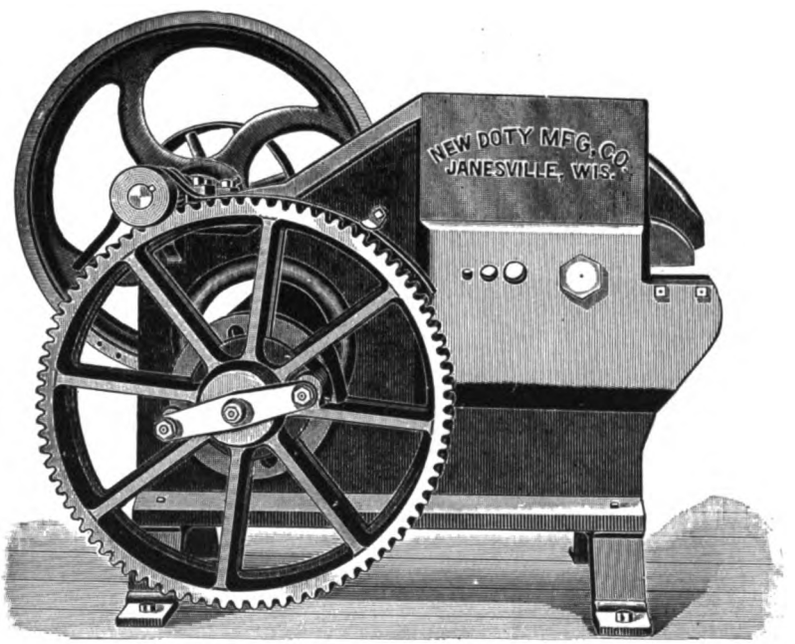
New Doty Punches and Shears

No. 7 Series Alligator Shears

MADE IN
SIX SIZES



THESE machines are very strong and powerful. The knives for flat and round iron are independent of each other, and are always ready for use. The round iron knives are made the reverse of the iron and so do not flatten it in cutting.



THE eccentric is of such a shape that there is a slight pause after each stroke to allow the operator to adjust the metal for the next stroke.

---Manufactured by---

THE NEW DOTY MFG. CO.

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INTER-STATE COAL & COKE CO.,

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AND GET

Genuine George's Creek Cumberland

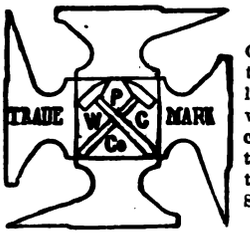
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YOU WILL NEVER FAIL

To Make a Strong, Clean Weld If You Use Perfection Welding Compound.

We invite you to give our Compound a thorough test, and will ship any amount to any address for that purpose. If it does not prove just as represented we pay all expenses.



Perfection Welding Compound will do the trick quickly and neatly. It makes a stronger weld than any other compound manufactured, as proven by the tests it has undergone. Send for free sample.

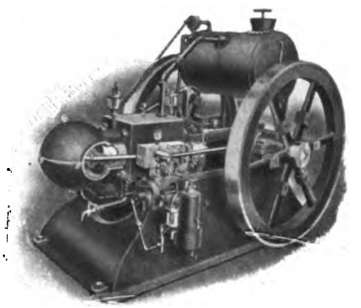
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PERFECTION WELDING COMPOUND CO., SCRANTON, PA.

I have used Buffalo Blowers for the past ten years and can say that I have not found anything short about them. I think they are all you claim and even more. Success to you.

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LIGHTNING GASOLINE ENGINES



Steam Cooled
Double Piston
No Foundation

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THE SCIENTIFIC HYDRAULIC TIRE SETTER



IS WHAT YOU WANT.

WRITE TO

STANDARD TIRE SETTER CO.,

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HAY-BUDDEN SOLID WROUGHT ANVILS

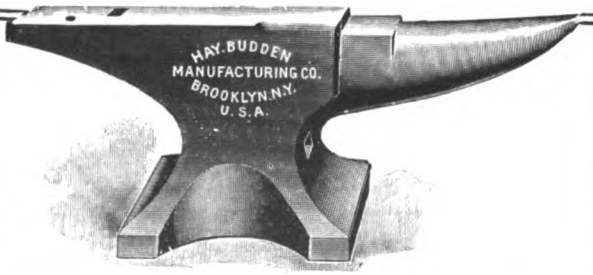
FIRST MADE IN AMERICA

The Gold Medal Anvil

HIGHEST AWARD

OMAHA, 1898 PAN-AMERICAN, 1901

Every Genuine "Hay-Budden" Anvil is made of the best **American Wrought Iron** and faced with the best **Crucible Cast Steel.** Every genuine "Hay-Budden" Anvil is made by the latest improved methods.



Over 100,000 in Use

WARRANTED

WEIGHTS FROM 10 to 800 LBS.

Experience has proved their worth and demonstrated that **"HAY-BUDDEN" Anvils** are Superior in Quality, Form and Finish to any others on the Market.

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VOLUME 6 NUMBER 8

THE AMERICAN BLACKSMITH

A Practical Journal of Blacksmithing and Wagonmaking

BUFFALO N.Y. U.S.A.

MAY, 1907

$1.00 A YEAR
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COLUMBIAN ANVILS
ALL-STEEL

SOLID BOX, BLACKSMITHS' VISES.

The front and back jaws are forged from ONE PIECE of ingot steel. No scrap used.

The jaws are faced with CRUCIBLE STEEL.

The box is deeper and the jaws open wider than is usual. They admit of a wider gauge of work in proportion to their size than any other on the market.

They are never under weight.

The Screw is fitted with a CONCAVE WASHER—this prevents the slightest possibility of stripping the threads.

Only vise having high-grade mirror finish.

These anvils are one piece with metal properly distributed for perfectly balanced weight.

They have a greater surface area for their weight than any others on the market because of the correct distribution of the metal. For example, a Columbian Anvil, 3½x14½ inch surface, weighs 100 lbs., frequently less; in order to obtain this same surface in a wrought anvil of other makes, the user must buy 115 lbs. or more of metal.

Width of base is always equal to the height.

"Rings like a bell."

Columbian products always guaranteed,

AND

"If it's not right, we'll make it so."

THE COLUMBIAN HARDWARE CO.

BRANCH
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NEW YORK.

CLEVELAND, O.

BRANCH
45-47 E. LAKE ST.
CHICAGO.

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Would You Pick Up Silver Dollars?

HOW many times have you seen our ads before? A good many, perhaps, for they've been here for years.

But if you have never yet sent for our printed matter to find out more about our tools, the reading of the ads didn't do you much good, did it?

If you saw silver dollars lying around your door, would you bother to take time to pick them up?

Yet who can tell how many dollars might float your way by investing two minutes' time and a post card, asking for our new 1907 Machinery Catalog?

Isn't it worth that much to find out?

You'll certainly learn something about "Silver" quality and that really means silver dollars for you.

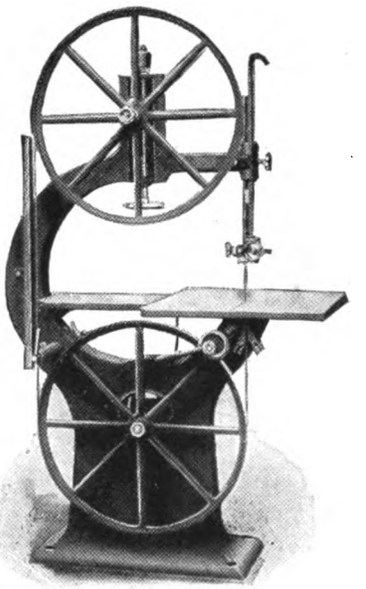
Silver Manfg. Co.

365 Broadway,

Salem, Ohio, U. S. A.

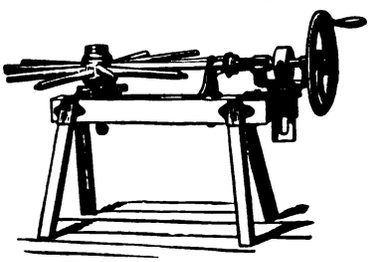
Improved Band Saws

Foot and belt power. New patterns throughout—rigid, symmetrical construction, new table tilting device, perfectly balanced wheels. Belt shifter, adjustment of upper wheel, saw guide, tension of saw blade, etc., all within easy reach of the operator. Sizes, 20 to 36 inches.



Spoke Tenon Machine

Dole and Deming's patent for hand and power; cuts tenons on spokes and does it perfectly. Its absolute accuracy adapts it to highest grade work.



Portable Forges

We make 14 kinds of Portable Forges. We have a size to suit your needs. Strong and durable. Attractive designs.



Fig. 901, with Shield.

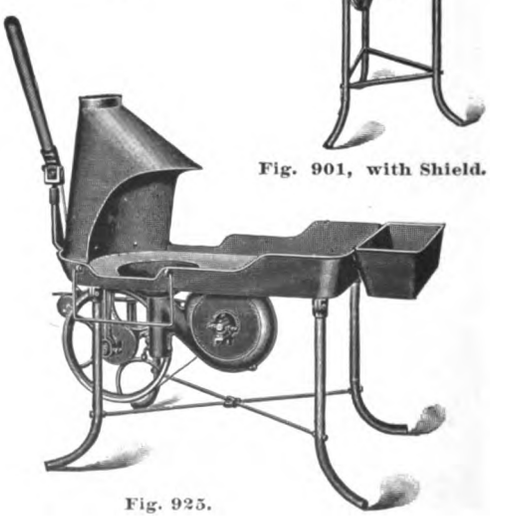
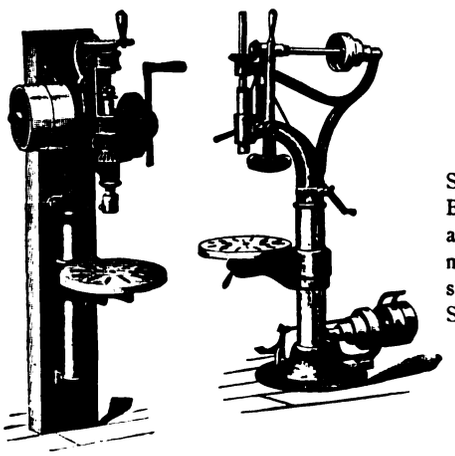
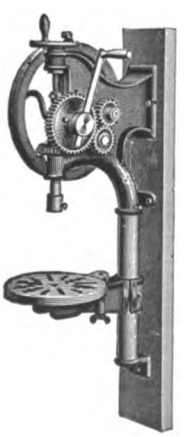


Fig. 925.



Drills

Swing, Post and Bench Drills for hand and power. Automatic feeding, new simple and efficient. Strong and durable.

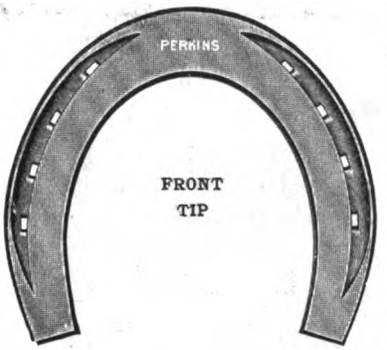


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HIND
LONG HEEL.

Look for this Trade Mark ★ The Star brand beats all others



FRONT
TIP



FRONT
LIGHT.



FRONT
TOE WEIGHT.

★PERKINS★
HORSE SHOES
AND
TOE CALKS
The **SUPERIOR** Kind

Have more points of superiority than any other make. An up-to-date shoe for up-to-date Blacksmiths.



HIND
SIDE WEIGHT.

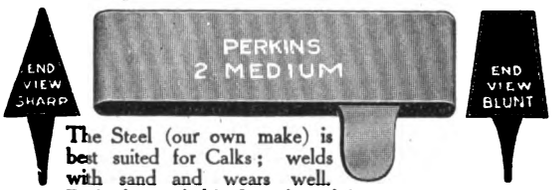
Perkins Shoes have given satisfaction wherever used. Our line is complete and every shoe guaranteed. Made in all styles and sizes. Send for sample. New Pattern Front Extra Light and Light. Free for the asking. We will gladly send

COMPLETE CATALOGUE AND SAMPLES FREE.

WRITE TODAY.

PERKINS

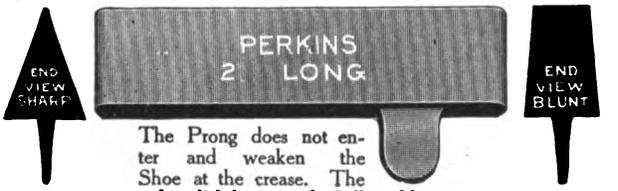
Made in Medium and Long, both blunt and sharp. Packed in 25 lb. boxes.



The Steel (our own make) is best suited for Calks; welds with sand and wears well. Perfectly graded in Length and Size.

TOE CALKS

Chisel Pointed Prong. These cuts show exact size of No. 2. SAMPLES SENT FREE.



The Prong does not enter and weaken the Shoe at the crease. The only slightly curved Calk sold.

MANUFACTURED BY

RHODE ISLAND PERKINS HORSE SHOE COMPANY

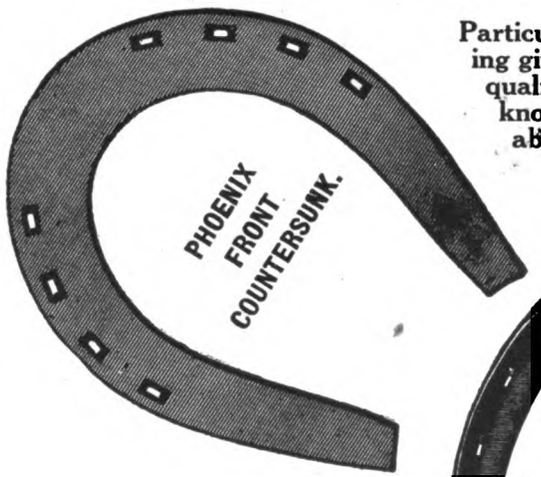
PROVIDENCE, RHODE ISLAND.

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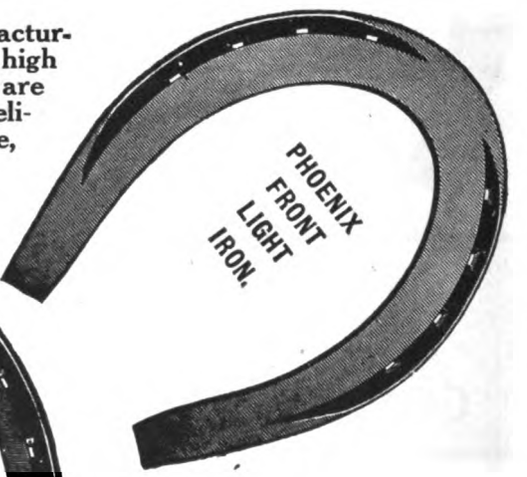
The Phoenix is a mythical Egyptian bird. It is said that only one of them lives at a time and when he perceives that his end is near, he builds a nest of some selected twigs. Upon his nest he allows himself to be burned to death, and from his ashes, we are told, arises a new Phoenix, a robust youngster, sound and healthy.



PHOENIX
HORSE AND MULE SHOES
ALWAYS COME OUT OF THE FIRE IN PERFECT CONDITION



Particular care in manufacturing gives our shoes the high quality for which they are known to every old reliable and progressive, young shoer.



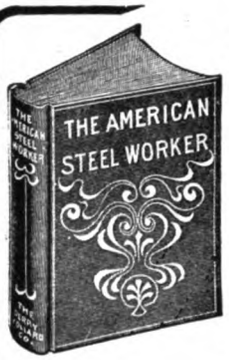


Give your customer the very best you can for the money If you do this, it means a satisfied patron, more business and more profit. Let Phoenix shoes help you to that end.

Phoenix horse and mule shoes are made in all styles. We have the most complete line on the market. Don't fail to write for our illustrated, descriptive booklet, sent free on request. Write today.

PHOENIX HORSE SHOE CO.,
CHICAGO, ILL.
ROLLING MILLS AT POUGHKEEPSIE, N. Y., AND AT JOLIET, ILL.

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BIGGER AND BETTER THAN EVER

IS THE NEW EDITION OF

THE AMERICAN STEEL WORKER

New binding, new paper, new everything, and a big chapter on High Speed Steels added. It's written in good plain English and tells you just what you want to know, whether it is buying, working, tempering, hardening, welding or selling steel. Tells you how to build furnaces, make baths and the hundred and one other important features in steel working. Markham has had over 27 years' experience at this sort of thing, and he knows. We'll send the book on approval if you desire. It contains over 350 pages, well filled with good Illustrations, and is neatly and substantially bound in green and gold.

PRICE, $2.50

—money back if not satisfactory.

AMERICAN BLACKSMITH CO.

P. O. Box 974 BUFFALO N. Y., U. S. A.



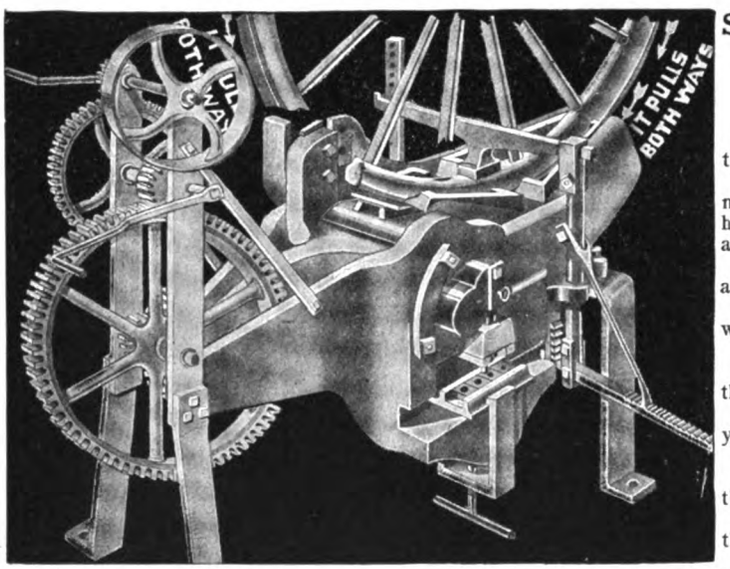
ATTENTION!

We wish to call the attention of the blacksmiths to the accompanying cut, which illustrates the Humane Cushion Heel Shoe and which is the coming shoe for this country. They are a concussion reducer and an action restorer, and produce a soft tread on the hard paved streets.

You run no risk in ordering, as every shoe is guaranteed. Order a few pairs and we are willing to abide by your decision for future orders. Order today from

THE HUMANE HORSE SHOE COMPANY,
Lima, Ohio.

THE HOUSE COLD TIRE SETTER



Our competitors, through their fine ads have sold some machines there too, but they have comparatively all been thrown out. And why not! Just think of a tire setter made with its heads to move on a straight line, instead of moving with the curve of the wheel! They might set tires on square wheels if there were any, but how can they set tires on a round wheel without injuring the wheel?

Remember, we give you the best shear and punch in the world free, and sell our machines cheap and on easy terms.

Sets in your shop like a friend to make you a present of every dollar taken in on it.

You can have one if you like, as it costs you less than the price of three days work.

The truth of the above is, it does set a tire in five minutes, thus earning $6.00 per hour. Just count up the hours when you have taken in the price of the machine and see for yourself.

And this statement is not only true, but we guarantee it and our guarantee is good.

And besides the profit, it does the work so easily and well that you will find it a joy forever.

They cannot be broken nor worn out.

Uncle Sam has seen the truth of the above and adopted them.

Now, in consideration of the above why not send us your order?

What can you be afraid of?

There are thousands of them in use and they are in all the States.

800 smiths in our native State have bought them and they are still buying.

We sold them there first, they have tried them well and know what they are.

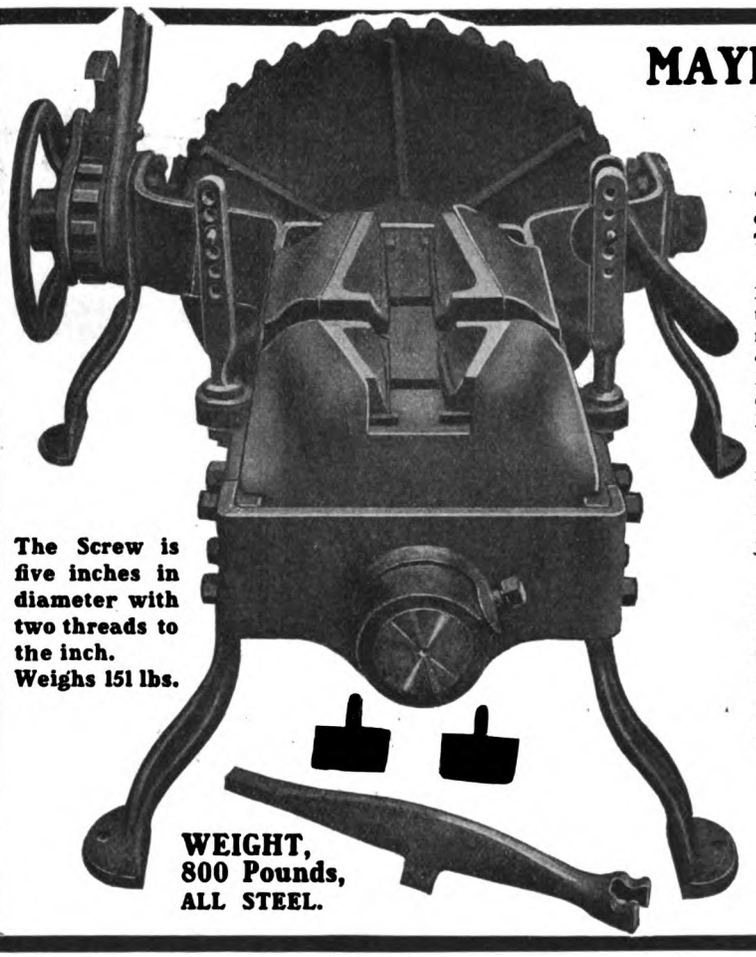
The House Cold Tire Setter Co.,

Office and Factory Nos. 216 to 220 So. Third St.,

ST. LOUIS, MO.

Also J. F. House, 40 Church St., Toronto, Ont., Can.

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The Screw is five inches in diameter with two threads to the inch. Weighs 151 lbs.

WEIGHT, 800 Pounds, ALL STEEL.

MAYERS COLD TIRE SETTER.

It is just as **GOOD** as it **looks.**

SIMPLE, POWERFUL, DURABLE.

"Does the work" and does it RIGHT. Why? It's the **only** machine in which **BOTH HEADS come together at SAME TIME** and therefore tightens both sides of the wheel the same.

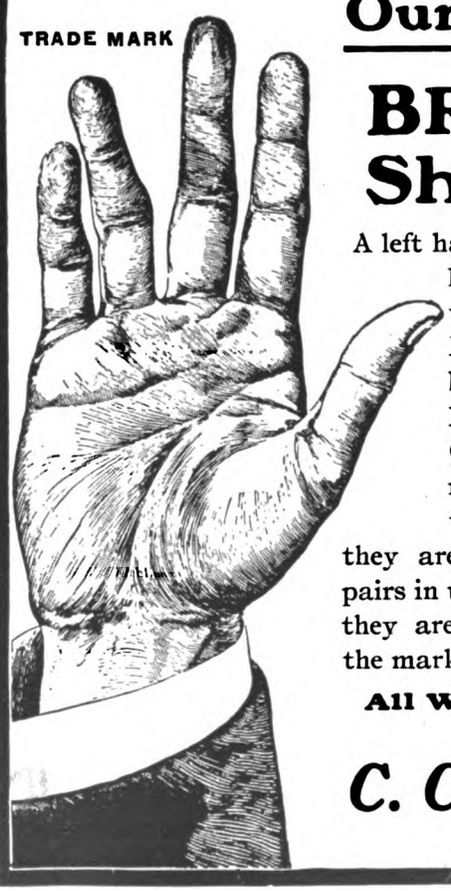
Also, it **automatically** adjusts itself to **any size wheel. How?** As the heads open by screws (one being right handed, the other left) the **CIRCLE** in the HEADS is INCREASED to fit the LARGEST wheel. As **heads** are brought together, the **circle** in head DECREASES and fits the SMALLEST wheel. A LARGE wheel must be "set" in a longer space than a smaller one. **In every other machine** the space is the same for a large wheel as a small one.

Again, to upset a tire ½ inch, **each head** moves only ¼ inch; to upset ¼ inch, **each head** moves only ⅛ inch, yet the tire is in a circle to fit it. **Result, a perfect set.** You can set the **thinest** buggy tire and not use the felloe clamp **AT ALL.** Just try to do this on **any other** machine.

These are **strong statements.** But a **stronger** one is this: We want **YOU** to try it before **YOU BUY IT.** If it suits **YOU,** keep it. If it don't suit **YOU,** don't keep it. Would we not be **FOOLISH** to **offer** this unless we knew what we said **WAS TRUE?** Would **YOU** not be **foolish** to buy any kind of a machine until **YOU TRIED IT?** Which will **YOU do?** Know for yourself by a **TRIAL,** or be **DECEIVED** by LOUD TALK, **wilful MISREPRESENTATION** and **FALSE** statements about our machine.

Mayers Tire Setter M'f'g Co.
1721-23 N. 8th St.
ST, LOUIS, MO.

TRADE MARK

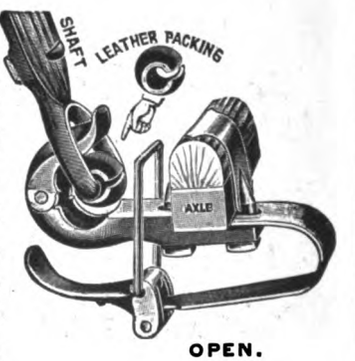


Our Trade Mark

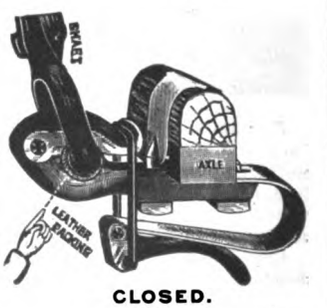
Represents the only Tool required to operate the

BRADLEY Ball Bearing Shaft Coupling.

A left hand will do as well. We are willing to hold up our right hand and swear that we are the original makers of a Ball Bearing, Leather Packed Shaft Coupling, that **Bradley Couplings** are Drop Forged from Bar Steel, are Silent, Quick Shifting, Self Lubricating, Automatically take up their own wear and will outwear any vehicle to which they are attached. There are over a million pairs in use. Quality and advantages considered, they are the cheapest and best couplings on the market.



OPEN.



CLOSED.

All We Ask is a Chance to Prove Our Statements.

C. C. Bradley & Son,
Syracuse, New York, U. S. A.

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Buffalo 200 and 306 Blowers

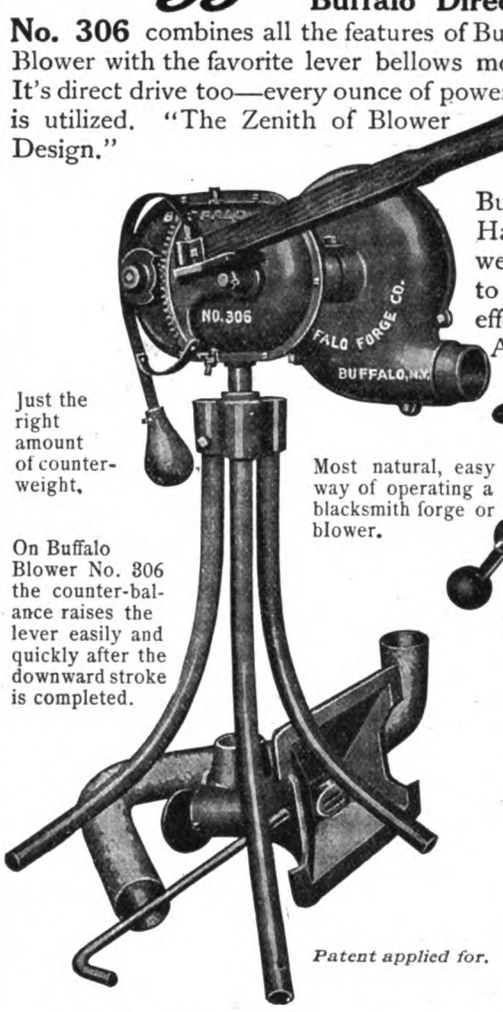
Buffalo Direct Drive Blower

No. 306 combines all the features of Buffalo No. 200 Blower with the favorite lever bellows motion. It's direct drive too—every ounce of power is utilized. "The Zenith of Blower Design."

GUARANTEED FOR FIVE YEARS

GUARANTEED FOR FIVE YEARS

Buffalo Nos. 200 and 306 Geared Hand Blowers are guaranteed to outwear any others on the market and to produce a stronger blast with less effort than any other blower built. Any parts wearing out in five years will be replaced free of charge and no questions asked.



Just the right amount of counter-weight.

On Buffalo Blower No. 306 the counter-balance raises the lever easily and quickly after the downward stroke is completed.

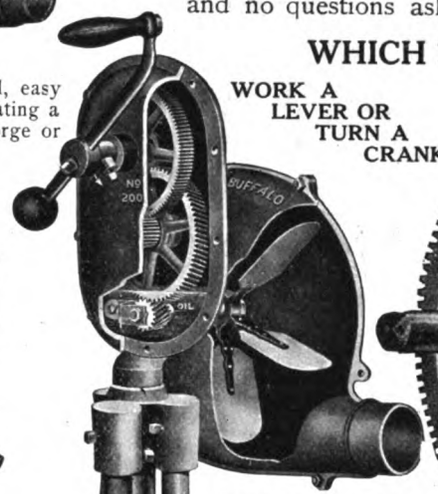
Patent applied for.

Buffalo Direct Drive Blower No. 306 with new H. H. Tuyere.

WHICH ?

WORK A LEVER OR TURN A CRANK?

Most natural, easy way of operating a blacksmith forge or blower.



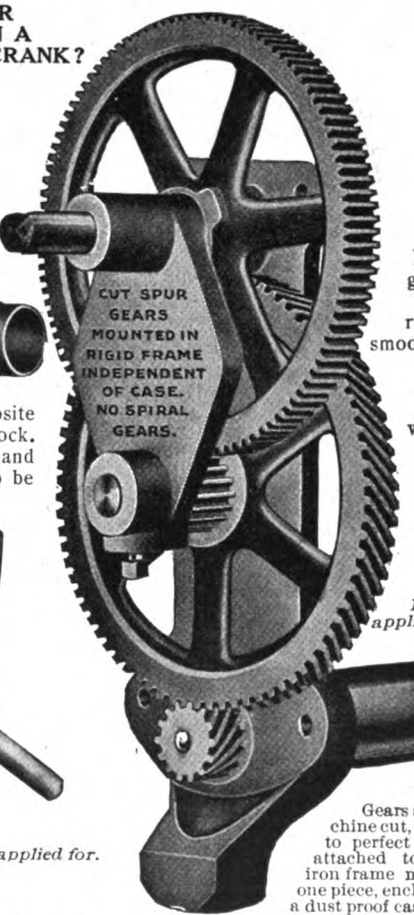
Crank turns opposite to hands of a clock. Cut shows right hand blower—can also be built left hand.

Patent applied for.

Sectional view of No. 200 Blower, showing Solid, Independent Mounting for gears and No. H H Tuyere.

GEARING.

No Spiral Gears to wear out.



Helical gearing has running smoothness of spiral gear without its wear.

Patent applied for.

Gears are machine cut, ground to perfect finish, attached to solid iron frame made in one piece, enclosed in a dust proof case, running in oil. A perfect self-oiling machine.

TELLING POINTS OF BUFFALO BLOWERS NOS. 200 AND 306.

GEARS—Heavy, with large, strong, machine cut teeth, cut spur and helical variety, which reduces friction and increases efficiency.

BEARINGS—Bored from solid castings and reamed to gauge, ensuring perfect alignment and easy, silent running.

OILING—Gears constantly run in oil, keeping the working parts perfectly lubricated.

New 1907 Catalog sent on request.

Sold by Best Dealers Throughout Entire World.

Buffalo Forge Company
Buffalo, N.Y.

Canadian Friends Buy of The Canadian Buffalo Forge Co., Ltd., Montreal, and Save Duty.

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HONEST DEALINGS.

Before an advertisement is accepted for this Journal, inquiry is made concerning the standing of the house signing it. Our readers are our friends and their interests will be protected. As a constant example of our good faith in American Blacksmith advertisers, we will make good to subscribers loss sustained from any who prove to be deliberate swindlers. We must be notified within a month of the transaction giving rise to the complaint. This does not mean that we will concern ourselves with the settlement of petty misunderstandings between subscribers and advertisers, nor will we be responsible for losses of honorable bankrupts.

MILTON WASHERS



Are like all other "Milton" products—the best of their kind. We make them of every size and for every purpose. They are cut from plate rolled expressly for the purpose, by a special process, which insures their being true to gauge and well finished. Having exceptional shipping facilities we can guarantee prompt and satisfactory deliveries. Would be pleased to have you send us specifications when you are again in the market for this class of goods.

THE MILTON MANUFACTURING CO., Milton, Penna.

We also make Hot Pressed and Cold Punched Nuts, Bar Iron, etc.



Send for New Catalogue.

DAM YOUR VISE

troubles by using

The "PITTSBURGH" Automatic Vises

They will not *only* permit you to hold *your* work, but your religion. Everyone is using them. Get in line.

The Pittsburgh Automatic Vise & Tool Co., Pittsburgh, Pa.





A Strong Arm Does Not Mean A High Salary

It's **brain** not **brawn** that commands the best paying positions. The man who can wield the heaviest hammer or lift the greatest weight does not get as much salary as the man who tells him when and where to apply his strength. In other words, a man who can plan and direct the work of others is worth many times as much as the man who can only do the work that others plan.

The way to advance to a better position and increased earnings is not to increase the strength of your arm but to increase the strength of your brain—to secure the knowledge that will qualify you to hold a position as foreman, superintendent, or manager, and to double and triple your earnings.

This you can do in a remarkably quick and easy manner as thousands of others have done before through the I. C. S. Courses of home training. It puts you under no obligation to ask us how we can raise **your** salary in the simplest and surest way in the world. Simply mark and mail the coupon. Will you let a postage stamp stand between you and a better position?

International Correspondence Schools

Box 1302, Scranton, Pa.

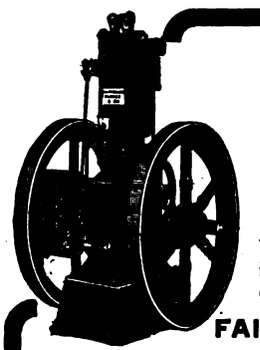
Please explain, without further obligation on my part, how I can secure a larger salary and advancement to the position before which I have marked X.

Foreman Molder	Electrician
Foreman Blacksmith	Architect
Foreman Machinist	Structural Engineer
Foreman Toolmaker	Contractor and Builder
Foreman Patternmaker	Foreman Plumber
Mechanical Engineer	Civil Engineer
Machine Designer	Surveyor
Mechanical Draftsman	Mining Engineer
Stationary Engineer	Bookkeeper
Electrical Engineer	Stenographer
Electric-Lighting Supt.	U. S. Civil Service Exam.
Electric-Railway Supt.	Ad Writer

Name _____

St. and No. _____

City _____ *State* _____



Look Ahead

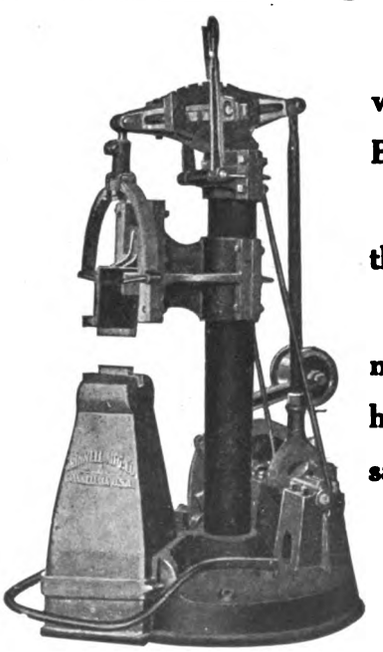
The far sighted blacksmiths are closing their 1907 contracts for

Fairbanks-Morse Gasoline Engines

Why not be an agent and install one in your shop where you can show it to the best advantage. They are so Reliable and so well known you can't help making money. Send for Proposition No. 487 A. P.

FAIRBANKS, MORSE & CO., CHICAGO, ILL.
12 DEY ST., NEW YORK.

Modern Power Hammer



The ONLY hammer on which you can get a LIGHT BLOW at FULL SPEED.

The shifting lever controls the length of stroke.

Set it in any one of the five notches and then handle the hammer with the treadle the same as any other.

Actually five hammers in one.

Write any jobber or the

THE GRINNELL MFG. CO.,

GRINNELL, IOWA.

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"QUICK ACTION"
IGNITING DYNAMOS
Excel all others!

The only generator that cannot lose its magnetism. For either make and break or jump spark work. Also spark coils. Send for Catalogue B.

The Knoblock-Heideman Mfg. Co.,
SOUTH BEND, IND.

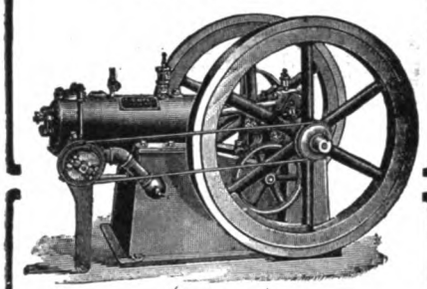
HAUSAUER-JONES PRINTING COMPANY

PRINTERS, ENGRAVERS
BOOK BINDERS

253-257 Ellicott Street, Buffalo, N. Y.

Printers of THE AMERICAN BLACKSMITH, also Complete Equipment for the production of Machinery Catalogues, Stock Farm Catalogues, College Annuals and Catalogues in Foreign Languages, promptly, accurately and tastefully : : : : : : : : : : :

HAGEN
GAS AND GASOLINE ENGINES



(2-20 H. P.)

ECONOMICAL and RELIABLE POWER FOR THE SHOP-RUNNING BLACKSMITH and WAGON MAKER.

HAGEN ENGINES are recommended on account of their simplicity, durability, comparatively low price, small cost of operating and the ease and certainty with which they can be controlled.

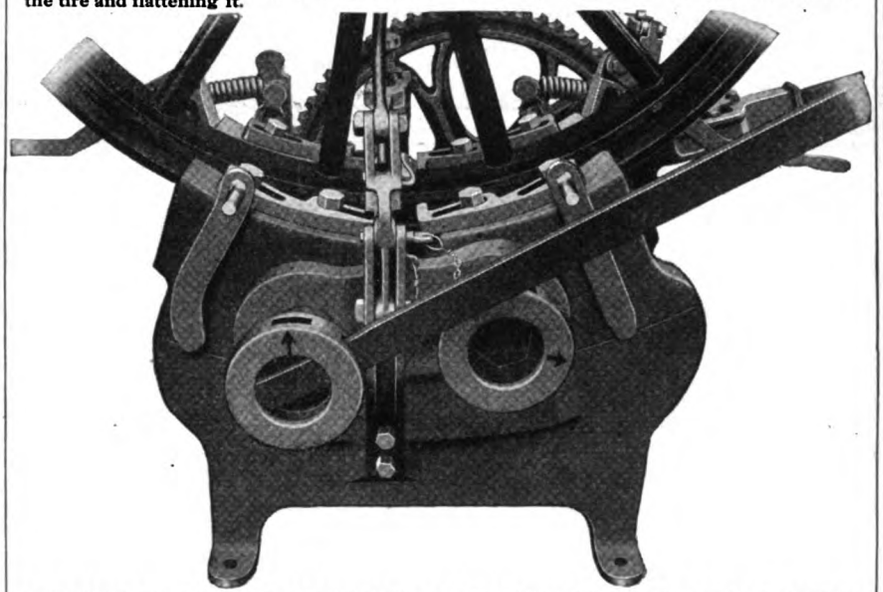
Our Catalogue explains all working parts. A postal will bring a copy to you. It's free. Write today.

HAGEN
GAS ENGINE AND MFG. CO.
Winchester, Ky., U. S. A.

WHY Does Uncle Sam Say the Brooks is the BEST MACHINE for setting all kinds of Tires---giving perfect satisfaction?

BECAUSE the Government has investigated and tried all other machines, but THE BROOKS is the only one made with the necessary lateral or side movement of the draw heads, so that they may line up with the tire and not bend it edgewise should one grip key get ahead of the other.

THE BROOKS IS THE ONLY MACHINE HAVING THESE FEATURES. Our gripping device prevents the key from stopping on the edge of the tire and bending it edgewise or kinking it. Our guideways on the base prevent the drawhead from rising up and kinking the tire and flattening it.



OTHER MANUFACTURERS ARE UNABLE TO OVERCOME THE DISADVANTAGEOUS FEATURES OF THEIR MACHINES ON ACCOUNT OF OUR PATENTS.

THE BROOKS IS LEADER OF THEM ALL.

The Brooks has more improvements and good practical features than any other tire setter made. There are thousands in use today—YOU should have one in your shop.
We make easy terms for payment. Write for our descriptive booklet, free.
We will also send you a handy vestpocket memoraudum book for the asking. WRITE TODAY.

The Brooks Tire Machine Co.
121 N. Water St. WICHITA, KANSAS.

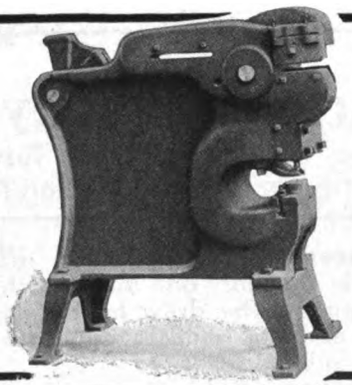
Scott's IXL ALL High Speed Steel

Will cut at least one speed faster than any other high speed steel on the market.

Write for Catalog covering entire line of SCOTT TOOL STEELS.

THE BOURNE-FULLER CO.,
Cleveland, O.

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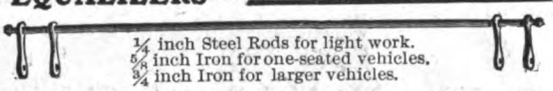
NO. 5 COMBINED PUNCH AND SHEAR.

Punches 5/8 in. hole through 5/8 in. iron.
Shears 5 in. x 1/2 in. flat iron bars.
Sheors 1 1/4 in. round iron bars.
Shears 8 in. x 1/4 in. band iron.

Our large descriptive circular will interest you. So will our price.

Badger State Machinery Co.
19-25 Trinity St. Janesville, Wis.

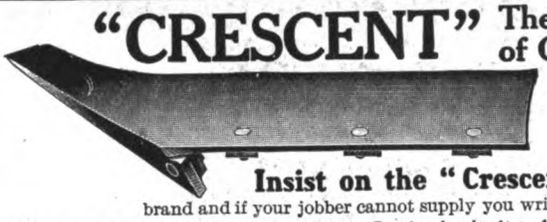
STEEL EQUALIZERS---FOR SIDE SPRING BUGGIES



1/4 inch Steel Rods for light work.
5/16 inch Iron for one-seated vehicles.
3/4 inch Iron for larger vehicles.

THE TOPLIFF & ELY CO., Elyria, Ohio.

"CRESCENT" The Mark of Quality





Insist on the "Crescent"
brand and if your jobber cannot supply you write us direct.

We manufacture a full line of High Grade Agricultural Steel Shapes, Fitted and Bolted Plow and Lister Shares, Merchant Plow Shares, Cultivator Blades, Subsoiler Blades, Landsides, etc., etc.

WRITE FOR CATALOGUE.

CRESCENT FORGE & SHOVEL CO., Havana, Ill., U. S. A.

UPRIGHT DRILLS



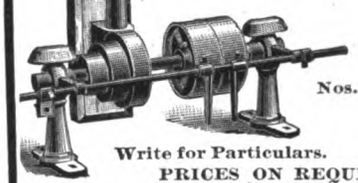
THE BEST IN THE LAND

These machines are arranged for both hand and power The balance wheel shaft is lengthened and has a three-step cone pulley, 2-inch belt.

The countershaft, with hangers, has a three-step cone pulley, and 7-inch tight-and-loose pulleys for 2 1/2 in. belt.

Weight of No. 5, 200 pounds.
Weight of No 6, 255 pounds.

We also furnish Nos. 5 and 6 Drills with tight-and loose pulleys, 7-inch, 2-1/2 inch face applied to balance-wheel shaft.



Nos. 5 & 6.

Write for Particulars.
PRICES ON REQUEST.

Francis Reed Company
43 Hamden St., WORCESTER, MASS.

How to Join THE NAVY.

If you are interested in what the Navy has to offer young men of good character, call or write the nearest *NAVY RECRUITING STATION.* Information regarding enlistment in all the various trades will be furnished you, whether you are ready to join now or not. If there is no Navy Recruiting Station in your vicinity, write to the

Bureau of Navigation,
Navy Department, WASHINGTON, D. C.,

for circulars and addresses of Recruiting Stations.

The pay is good, the life is healthful; food wholesome, and sufficient in quality; and for deserving, ambitious men, the opportunities for advancement in pay and rating are *excellent.*

Colville, Wash., Feb. 9. '07.

GEO. BARCUS & CO.

Gentlemen:

Yours of Feb. 2nd at hand. I received the stocks February 4th, have them up and have shod one horse in them and have another for Monday morning. I shod a horse in 45 minutes, that I have been throwing before I got the stocks. I took one shoe off at a time, sharpened it and put it back. Before, it took me from two and a half to three hours, and once he laid me up for a week. Will forward more money in a few days.

Yours truly,
C. C. DARNELL.

BARCUS HORSE STOCKS



ARE THE BEST AND CHEAPEST ON THE MARKET

FOR FULL PARTICULARS WRITE

GEO. BARCUS & CO.
Box 61,
WABASH, IND.

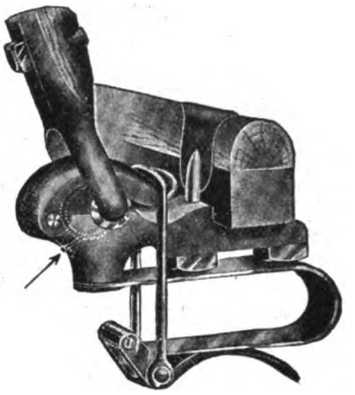
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ECCLES BALL-BEARING COUPLINGS

With Leather Bushings in one piece, securely fastened in the socket of the Coupling.

When the shafts are removed, the bushing does not come out, but stays in the Coupling where it belongs. NO LOST BUSHINGS WHEN YOU USE OUR COUPLINGS.

We would like to send you our circular and have you try our Couplings. They will save you money.



See the Clinch?

Pat. applied for

The Spring is pivoted at the front so that it can be turned forward out of the way of the wrench while clipping the Coupling to the axle.

These are two of the good points, but there are plenty more desirable features in our Couplings.

Patented Nov. 25, 1902.

We also have a Catalog showing our full line of **Carriage and Wagon Forgings** all of which we make.

RICHARD ECCLES CO., Auburn, N. Y.

The BEST TOOL on Earth for a Horse Shoer

Price, Cash with Order, $1.75 Each

By Express Charges Paid to any point in United States



Patented Jan. 2, 1894.

THE IMPROVED EASY HOOF TRIMMER

DIMENSIONS.—Weight, 2 lbs., Length, 12 ins., Opens 2 ins., Cuts 1 in. **OUR GUARANTEE.**—If you don't like it you can return it and get your money. **Directions for Using.**—First—Hold the foot in the ordinary manner and remove soft parts from bottom with your toe knife; then with the trimmer begin at the heel and cut down and around the toe and back on the other side, removing the part at one cut and in one piece. Second.—Avoid all wrenching or prying. Hold the tool as near upright as you can. Cut straight through to the blank jaw regardless of nails or other obstructions, and with very little leveling with the knife or rasp your job is complete.

THIS TOOL has been rightly named because it is EASY to adjust, EASY to sharpen, and EASY to convince a horse shoer that it will cut a hoof down easier, quicker and better than any tool he ever saw.

It has a detachable knife that can be removed or replaced in a moment. The knife jaw is adjustable by means of screws. When the knife becomes shorter by sharpening, give the screw a turn or so and the reins will go back to the proper distance apart. When knife wears out it can be replaced for a few pence.

CAUTION.—Don't make the mistake that a great many do by grinding bevel on one side of blade, but keep the bevel equal on both sides, so that it will pass through the hoof straight and not in a strain.

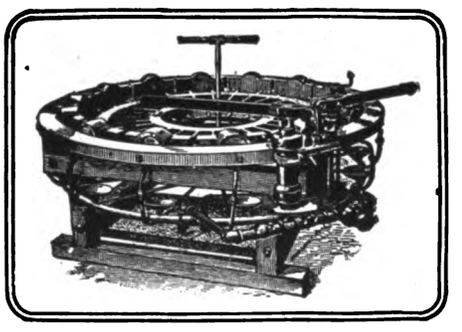
Follow above directions and you will soon learn to use THE BEST HOOF TRIMMER ON EARTH.

MADE BY

MUNCIE WHEEL & JOBBING CO., MUNCIE, IND.

Sole Wholesale Agents for the British Isles, **The Iron and Hardware Co., Ltd, Gloucester, England. C. Kloepfer, Guelph, Canada,** Agent for Dominion of Canada.

The West Hydraulic Tire Setter



Is a **Round Machine** for tiring **Round Wheels,** and compresses the tire at all points—not all in one spot—and the compression is so slight at any particular point that tire bolts do not have to be removed when resetting an old tire, neither are holes closed so bolts are tight in tire. Wheel is made compact and joints tight.

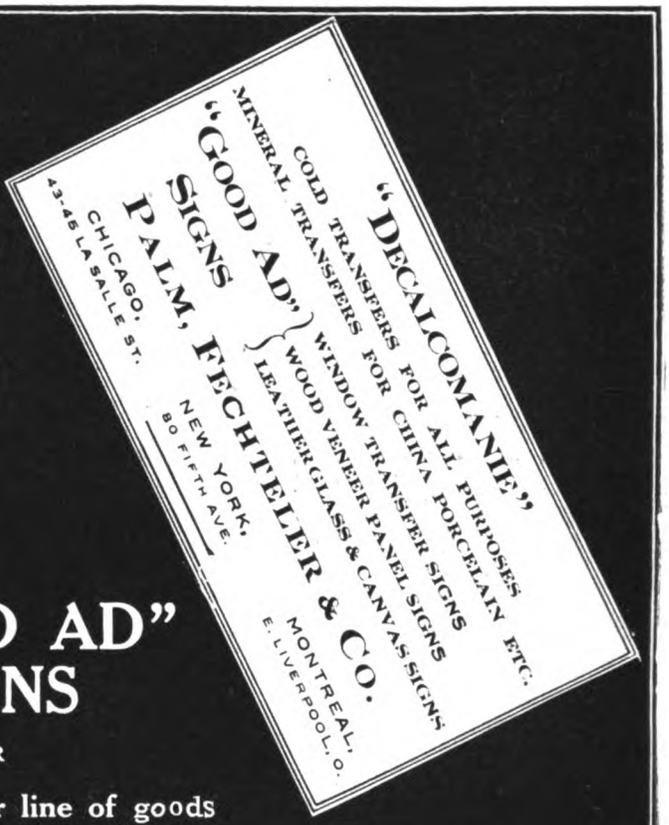
WRITE US YOUR REQUIREMENTS.

The West Tire Setter Company

ROCHESTER, N. Y.

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"GOOD AD" SIGNS

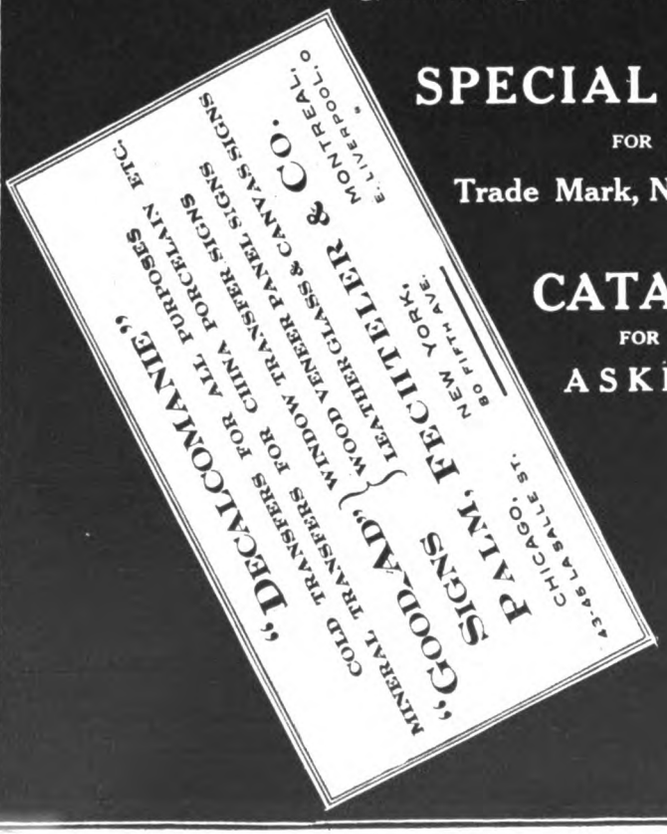
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Advertising your line of goods
to your agents and customers
WINDOWS AND DOORS, SHOW CASES, ETC.

REGULAR TRANSFERS

FOR

Decorating, Lettering and Numbering any job you have to do.



SPECIAL DESIGNS

FOR YOUR

Trade Mark, Name Plate, Etc.

CATALOGS

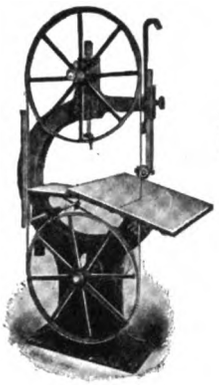
FOR THE

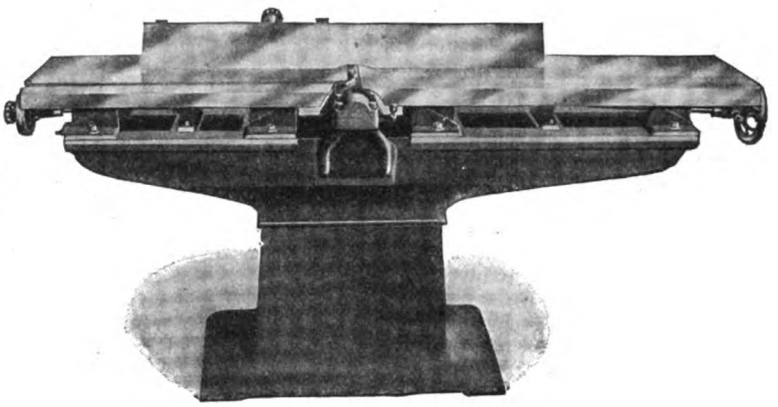
ASKING.

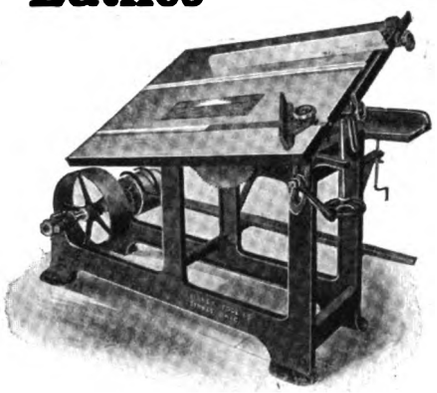


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Band Saws
Cut off Saws
Swing Saws
Rip Saws
Jointers
Lathes







TAKE NOTICE.

If you are in the market for high grade wood working machinery, at very moderate prices, and designed especially to meet the requirements of blacksmiths and wagon makers, write us for our 1907 catalogue.

The Sidney Tool Co., Sidney, O.

1843 **1907**

THE "EAGLE" ANVIL WORKS, Trenton, N. J.

The "EAGLE" is the ONLY ANVIL MADE IN TRENTON.

THE VERY FIRST MADE IN AMERICA.

None Genuine without the Eagle Trade Mark and "Fisher" stamped on side and end.

Cheaper and Better than any others. **More than 200 different patterns.**

PATTERNS.

Regular Blacksmith, Farriers', Farriers' Clip Horn, Plow Makers', Baby Vise and Anvil, Double Horn, Saw Makers', Instrument Makers', Chain and Axe Makers', Etc. Etc. Etc.

Weights from 10 to 800 lbs.

Do you want to be prosperous? Have you pride in your country? Then use an "EAGLE" ANVIL AND VISE, the first made in America. Low in cost and high in value. A **guarantee** goes with every anvil. To meet the demands of everyone, we have recently introduced to the public our **"BABY ANVIL AND VISE"** especially for the use of automobilists. At the Automobile Show, Madison Square Garden, New York, recently, the "Baby Anvils and Vises" were greatly admired and many were sold.

THE "EAGLE" ANVIL

has always taken the FIRST PRIZE at every exhibition wherever entered, from the Gold Medal awarded by the American Institute of New York in 1853, to dozens of others since, including the Centennial at Philadelphia in 1876 and the World's Fair at Chicago in 1893—the latest being that of the National Export Exposition of 1899 in Philadelphia. We have not sought further honors in that direction since: they are really of little interest or value. The practical experience of the working Blacksmith is worth very much more than the opinion of the gentlemen on the Prize Committees, obtained only from a hurried examination instead of any actual knowledge of the anvil's real excellence for work. Our prices are so low and our guarantee so absolute that every Blacksmith buying from us now can get the best anvil in the world for his money.



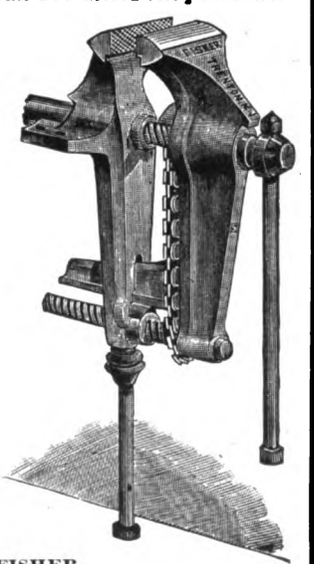
We Make to Order ANVILS of any Special Dimensions or Shape.

Warranted Better than the Best ENGLISH ANVIL.

Face in one piece of **Best Tool Cast Steel, Perfectly Welded,** perfectly true, of hardest temper, and never come off or "settle." Horn of tough **untempered steel** never to break or bend. **Only Anvil made in the United States fully warranted as above.**

Write for Descriptive Circulars and Special Discounts.

Sold only by Reliable Dealers all Over the World.



FISHER DOUBLE SCREW is fully warranted stronger than any other leg vise and always parallel. Is the best vise for machine shops and blacksmiths and for all heavy work. Accurate and durable.

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SOME POPULAR TOOLS

Royal Blower

"The Successful Blower"



Crank Turns Forward or Backward.

Noiseless and Easy to Operate

Gear case is oil-tight and dust-proof. Gears run in a continuous bath of oil.

Gears are Phosphor Bronze and Steel, flat and straight cut. No Spiral or Worm Gears.

Fire-pot is 8x9½x4 inches inside.

A powerful blast; lasting after blast

Fan, 12 inches. Height, 47 inches. Weight, 135 pounds.

Can be furnished to operate with the right arm, for left-handed smiths, when desired.



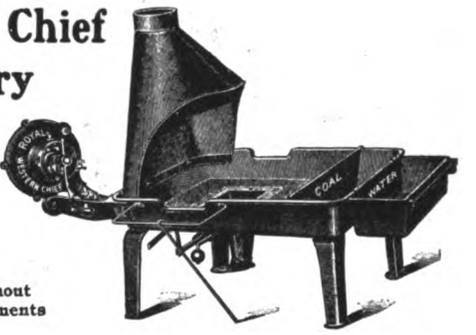
Royal (Western Chief) Forge No. 100

For use of Large Blacksmith, Wagon, Plow, Railroad Shops, Etc., where Heavy Work is Done, and a First-class Forge and Fire Are Needed.

Fan, 12 Inches.
Height, 30 Inches.
Weight, 300 Pounds.
Hearth, 31½ x 48½ Inches.
Length Over All, 53 Inches.

In this Forge we combine our "Royal" style of Blower with Western Chief Standard Hearth, having Solid Fire-pot with Tuyere Ball Furnishing side and center blast. We guarantee it fully.

Western Chief Stationary Forges



Six Different Styles

With or Without Blower Attachments



ROYAL FIRE-POT

Needs No Clay

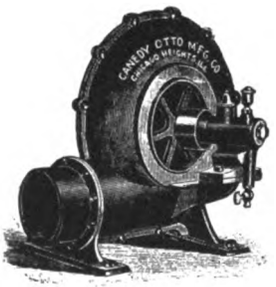
Dimensions 8 x 9½ 4 inches inside

Tuyere Iron

Write for catalogue describing our full line of

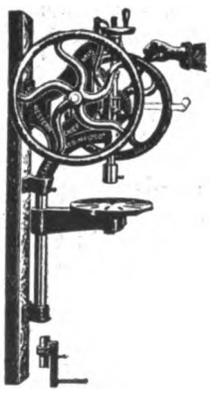
Forges, Blowers and Drills

For sale by first-class dealers all over the world.

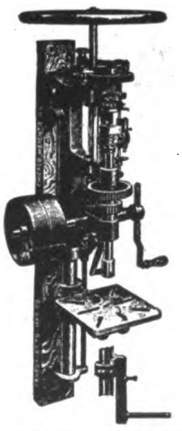


Western Chief Power Blowers

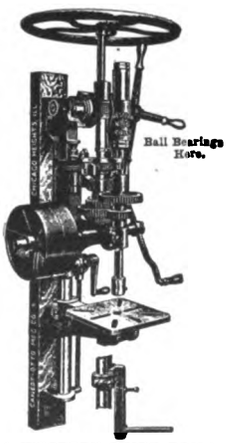
Built in sizes suitable for from one to seven fires



No. 15 WESTERN CHIEF DRILL.
Automatic Self-Feed. 19 in. Circle.



No. 14 WESTERN CHIEF DRILL.
Automatic Self-Feed, and the only AUTOMATIC Quick-Return Foot Drill Made. 21 in. Circle.



No. 16 WESTERN CHIEF DRILL.
Automatic Self-Feed and Hand Lever Feed. Largest Foot Drill Made. 24 in. Circle.



No. 17 WESTERN CHIEF DRILL.
Automatic Self-Feed and Hand Lever Feed. 24 in. Circle.

MADE BY **CANEDY-OTTO MANUFACTURING CO.**

CHICAGO HEIGHTS, ILLINOIS

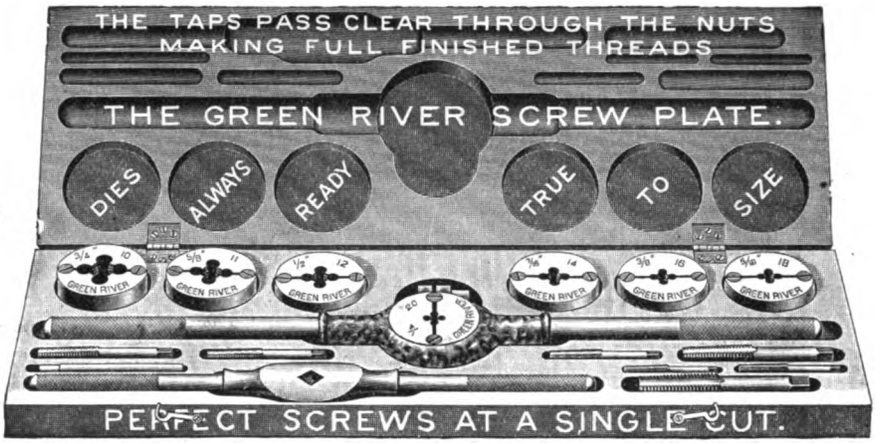
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Green River Screw Plates

will outwear any other screw plates made.

Durable and Honest Goods

Considered the best by all Blacksmiths



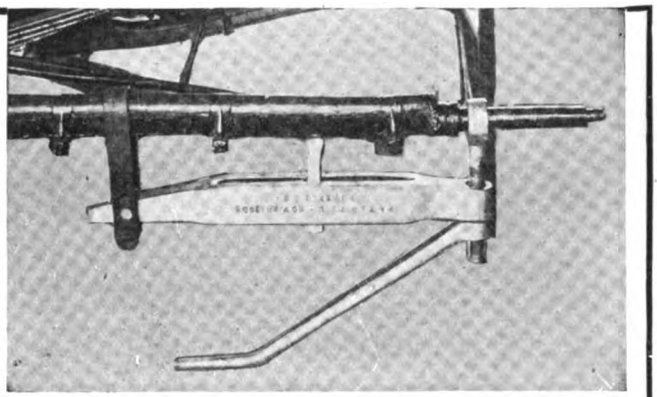
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SOLE MAKERS

Wiley & Russell Manufacturing Co.

GREENFIELD, MASS., U. S. A.

Send for Calalog No. 33 D—FREE



STEDHAM COLD AXLE SETTER AND STRAIGHTENER.

A Labor and Time Saving Machine that does its work perfectly.

For setting or straightening Buggy Axles and all vehicles having a steel axle. Also Pitman rods of mowers, reapers and binders, bent rods and shafts in section harrows, cultivator beams, shaftings, etc.

The axle can be straightened in the vehicle **cold**, better than to take it out and heat it, and in one-tenth the time. Saves all the trouble of taking the axle out. No scarring of the wood or breaking of the paint.

No blacksmith can afford to be without this labor saving machine. It will bring you business. Your customer does not have to leave his vehicle and come after it a week later. You straighten the axle while he waits.

No matter where the axle is bent, the machine is so adjusted that it may be placed in any position on axle. Up or down, out or in, just a few minutes with the "Steadham Axle Setter" and the job is done. From one to five minutes is all the time required. One man can more than pay for the machine in **one hour.**

Mr. E. A. Glenn of Rockwall, Texas, is one of the many satisfied users. He writes as follows:

Dear Sir:—The "Cold Axle Setter" that I bought from you, does the work splendidly. It is the best investment I ever made in my shop.

Further particulars on request. Or will ship at once on receipt of price, $10.00.

W. S. STEDHAM, ROYSE, TEXAS.

SELLING AGENTS { Buffalo Forge Co., Buffalo, N. Y.
Macgowan & Finigan Co., St. Louis, Mo.
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A GREAT OPPORTUNITY

DON'T MISS IT

WE HAVE A

SPECIAL PROPOSITION

FOR EVERYBODY WHO DOES CARRIAGE OR WAGON PAINTING

Write for particulars to

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Be sure to address DEPT. P for this special offer

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Men were satisfied with old fork wrench methods—now, it is simply a needless waste of time, temper and "knuckle skin" to handle tire-bolts with any ordinary wrench, when a little "Bay State" can be had that will so quickly (and so "slickly") set up or release such bolts. Blacksmiths, Wheelwrights and "Horse Sense" people in general, who have once met a "Bay State," never use any other sort.

THE BAY STATE CARRIAGE AND TIRE BOLT RATCHET WRENCH.

If your dealer don't have them, write us for tool lists for busy men.

TUDOR MANUFACTURING CO., Worcester, Mass.

Morse Twist Drill & Machine Co.

NEW BEDFORD, MASS., U. S. A.



Tools for Blacksmiths' Use.

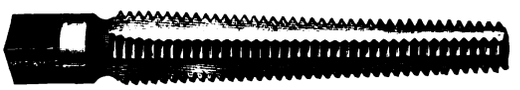
Twist Drills, Reamers, Taps, Chucks, Cutters, Dies, Machinists' Tools, Machinery.

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"MORSE"

the name that guarantees "quality," "accuracy" and "economy."

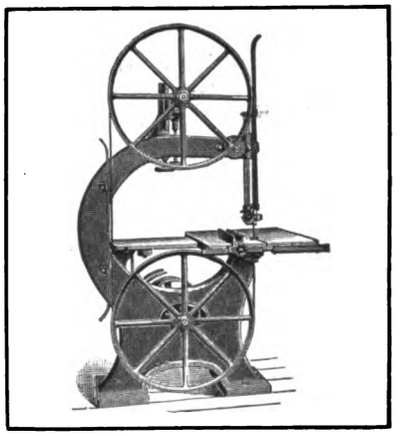
BLACKSMITH TAPER TAPS.



YOU NEED Wood Working Machinery.

Wood Working Machines in your Shop will enable you to do better work and more of it than you can do with hand tools.

We Build Just the Machine You Need.

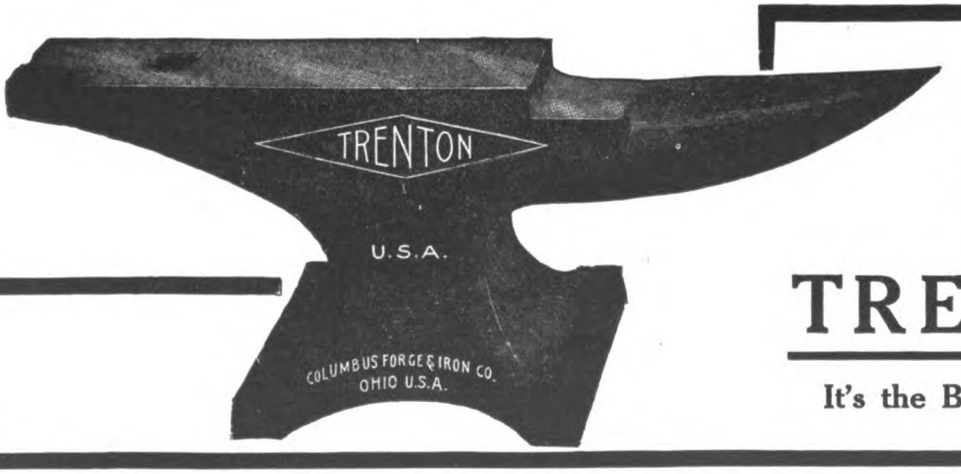


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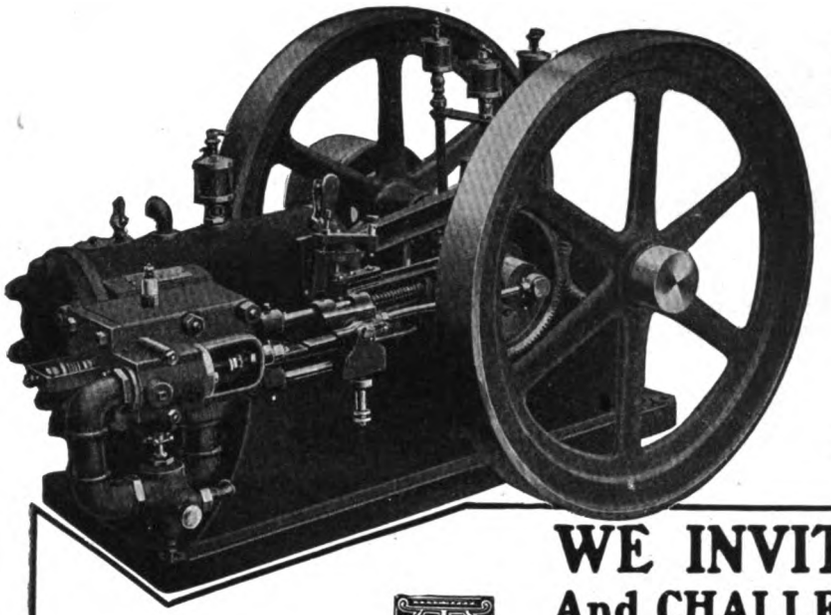


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TRENTON

It's the Best Anvil Made.

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Always Ready to Start.

No Engineer Required.

No Increase in Insurance by their use.

WE INVITE INSPECTION
And CHALLENGE COMPETITION

OUR "GIANT"
4 H. P. Engine
The Best on the Market for the user of small power. Write for details.

WILLIAMSPORT ENGINES are constructed by the most skilled workmen, and only the very best material used. We offer you an Engine of the Finest Quality, noted for its Simplicity, Durability, Ease of Operation and Beauty of Design. Our broad Guarantee covers all.

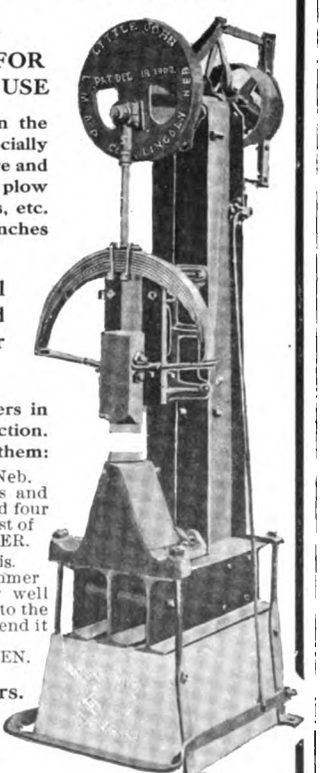
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WILLIAMSPORT, PENNA.

OUR GUARANTEE.

All Engines Absolutely Guaranteed free from all defects in workmanship and material. Any part found defective or faulty will be replaced by us free within one year from date of purchase.

THE "LITTLE JOHN"
POWER HAMMER
DESIGNED ESPECIALLY FOR GENERAL BLACKSMITH'S USE



The dies are set at an angle of 45° in the head which adapts the hammer especially for welding tires, springs, axles, bridge and structural rods and for sharpening plow lays, cultivator shovels, grader blades, etc. You can weld a piece of steel five inches square with it.

The "LITTLE JOHN" will strike a 900 pound blow and take less than one horse power to run it.

There are nearly 400 of these hammers in use today, every one giving satisfaction. Here's what our customers say about them:

Belden, Neb.
"I have bought one of your hammers and am well pleased with it. I have operated four hammers and I think yours run the best of them all." ANDREW SCHAUPNER.

Wrightstown, Wis.
"I have used a Little John power hammer for the past three years and am very well pleased with it and can recommend it to the public as being just what you recommend it to be. I would not be without one." JACOB KETTENHOFEN.

Write for descriptive circulars.
SENT FREE.
PRICES ON REQUEST.

Nebraska M'f'g Co., LINCOLN, NEB.

Little Giant
COMBINED
Punch and Shear.
The Most Powerful Lever Punch and Shear Made.

5 Punches and Dies with Each Machine.

MADE IN THREE SIZES.

No. 1—Will punch ⅝-inch hole in ½-inch iron. Cuts iron ⅝-inch thick and 1-inch round. Weight, 515 lbs.

No. 2—Will punch ½-inch hole in ½-inch iron. Cuts iron ½-inch thick and ⅞-inch round. Weight, 350 lbs.

No. 3—Will punch ⅜-inch hole in ⅜-inch iron. Cuts iron ⅜-inch thick and ¾-inch round. Weight, 280 lbs.

Only ONE operation of the Lever does the work. No changing required.

Note the improved Stripper and Hold-down. This machine is made for the blacksmith shop, and we DO claim that it is decidedly the best on the market for that place.



For Sale by your Jobber. If not, Write Us. Send for Circular.

Little Giant Punch & Shear Co., Sparta, Ill.

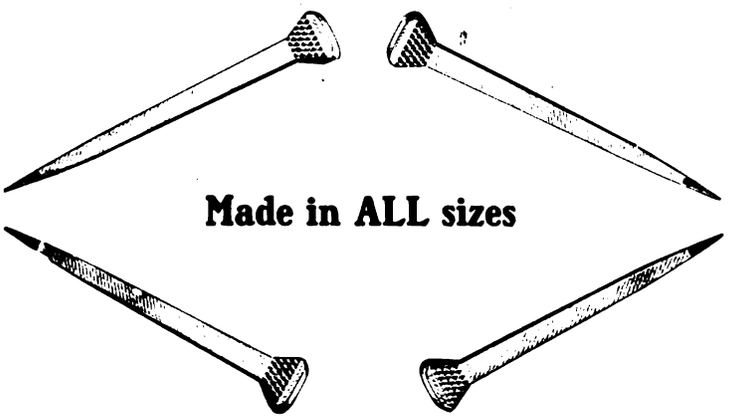
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PLATE PATTERN.

An Important Essential of a Horseshoer's Outfit is a Supply of

"CAPEWELL NAILS"



Made in ALL sizes

PLAIN PATTERN REGULAR HEAD.

PLAIN PATTERN CITY HEAD.

Be Sure Always to Specify for the Best and Easiest Driving Nail in the World—"THE CAPEWELL"

Made by **The Capewell Horse Nail Company**

HARTFORD, CONN.

The Largest Manufacturers of Horse Shoe Nails in the World.

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Buffalo:	11 Ellicott St.	Denver:	1611 Blake St.
Cincinnati:	720 Main St.	San Francisco :	Santa Fe Warehouse, Spear St.
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We Manufacture
SHEARS AND PUNCHES
Hand or power, for shearing and punching plates, bars and angles. Send for Catalogue C.
BERTSCH & CO.
Cambridge City, Ind.

IT'S THE SPARK THAT COUNTS

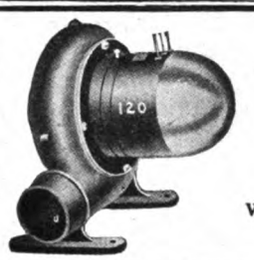


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S. L. JUMP SPARK COILS
Guaranteed against all imperfections in workmanship and material. If your engine doesn't work properly, try our system of ignition and your troubles will be at an end. Ask your dealer to show you our coils or write
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Milwaukee, Wisconsin



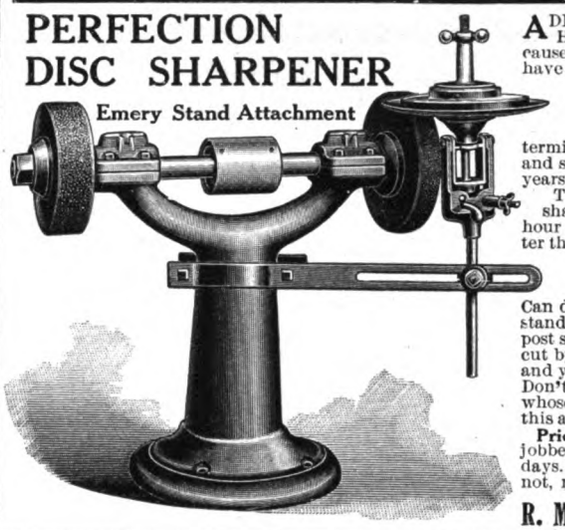
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ROTH FORGE BLOWER
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PERFECTION DISC SHARPENER
Emery Stand Attachment



A DEVICE that attaches to emery stand. Holds disc on emery so that the feed-pull causes disc to revolve **automatically.** We have never seen a disc or colter of any size or pattern with or without hubs that would not sharpen perfectly. Saves disc one-half more than chisel sharpeners. In experiments we have determined that disc harrow run over 250 A and sharpened once annually, will require 16 years to wear one inch off disc.

Two horse-power engine sufficient. Will sharpen forty to sixty 16 in. discs per ten hour day. $10.00 to $15.00. Big money. After the first day's work you can put the money in your pocket. By placing two discs in holder with felt between, grinding sound is softened so it will not annoy. Can do other work while running. If your stand has no round body, attach to round post set near emery. Hard discs refuse to be cut by chisels. Cold draw a plowshare twice and you are done. A disc is the same way. Don't pay an enormous price for a sharpener whose trade lasts **only two years,** but buy this and put the money in your pocket.

Price, $10.00. Weight 25 lbs. For sale by jobbers. Or send us $2.00 and use machine 30 days. If it suits, send us the other $8.00. If not, return it.

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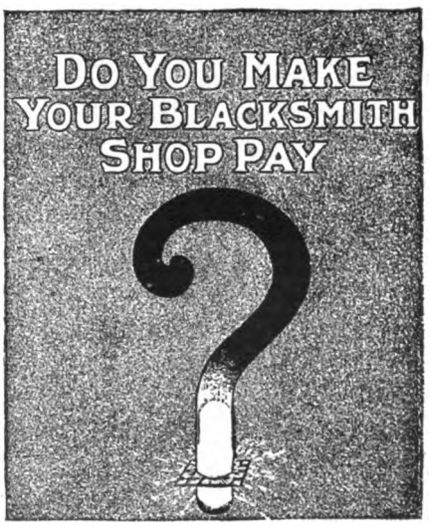
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Both will be in the "has been" class soon. Get wise, it means a good bit to us but a whole lot more to you.

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Welds gritty iron.
Welds steel castings.
Welds at a low heat.
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Does what you can't do now.
Get busy, your neighbor is on.
Send us a postal.
We'll do the rest.

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UNTIL YOU INVESTIGATE "THE MASTER WORKMAN," a two-cylinder gasoline, kerosene or alcohol engine, superior to any one-cylinder engine; revolutionizing power. Its weight and bulk are half that of single cylinder engines, with greater durability. Costs Less to Buy—Less to Run. Quickly, easily started. Vibration practically overcome. Cheaply mounted on any wagon. It is a combination portable, stationary or traction engine. SEND FOR CATALOGUE. THE TEMPLE PUMP CO., Mfrs., Meagher and 15th Sts., Chicago. THIS IS OUR FIFTY-THIRD YEAR.



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For Plow Work, Wagon Work, Heavy Work, Any Work.

"I have been using one of your Boss power hammers for the past four years without one cent of repairs and it is practically as good as new now. It will do all you claim and is the best one I ever have seen and I have seen a good many." C. TRENKLE, M'f'r of Wagons, Sleighs, Etc. Pennsylvania.

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THE Apple Automatic Sparker

that causes so much trouble on your gas engine, and install an **Apple Automatic Sparker.** No switches, no belts, no batteries for starting or running. A dynamo that produces a strong, steady current and furnishes a fat, hot spark at all times.

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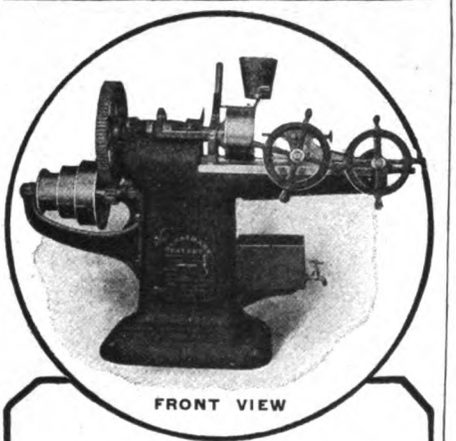


GUARANTEED

Jobbers sell at factory prices

$5.00 NET

TURNER BRASS WORKS
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Chicago, Ill.



FRONT VIEW

A Bolt Cutter is much like a man in this: THE HEAD is nearly everything.

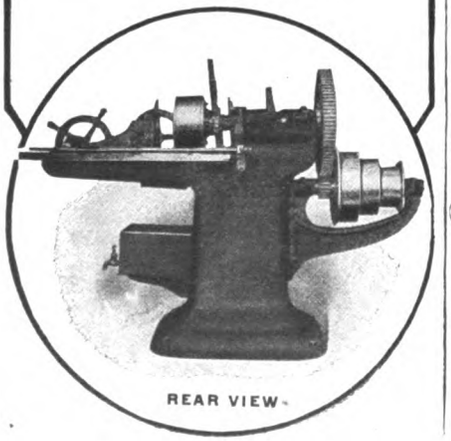
The Merriman Bolt Cutter Head is Noted for—

1. SIMPLICITY OF THE HEAD: Only Four Parts, consequently,
2. GREAT DURABILITY. Few repairs needed.
3. SQUARE BEARING OF THE DIES IN THE RING; consequently,
4. SOLIDITY OF THE DIES LIKE A SOLID DIE; consequently,
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SEND FOR CATALOG No. 11.

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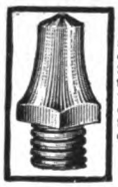


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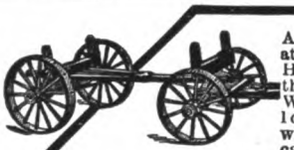
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ace **interchangeable** with all other makes of removable calks. Sold only to the **horseshoer,** through leading supply houses who are our regularly established agents, and direct from the factory, where no agencies are established.

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for farm wagons. Straight or staggered spokes. Any size wanted, any width of tire. Hubs to fit any axle. For catalogue and prices, write to

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Rubber Horse Shoes Are the Best?

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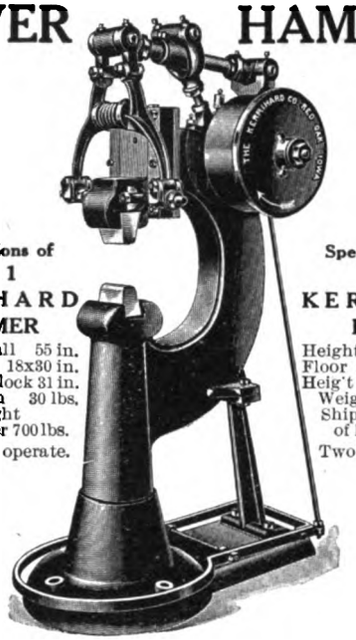
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OF THEM ALL
KERRIHARD'S
POWER HAMMER



Specifications of NO. 1 KERRIHARD HAMMER

Height over all 55 in.
Floor space 18x30 in.
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A first-class machine sold at a low price. Contains every modern feature. Strongly built of the best material. Will do your work easily and quickly and will do it right.
MADE IN TWO SIZES.

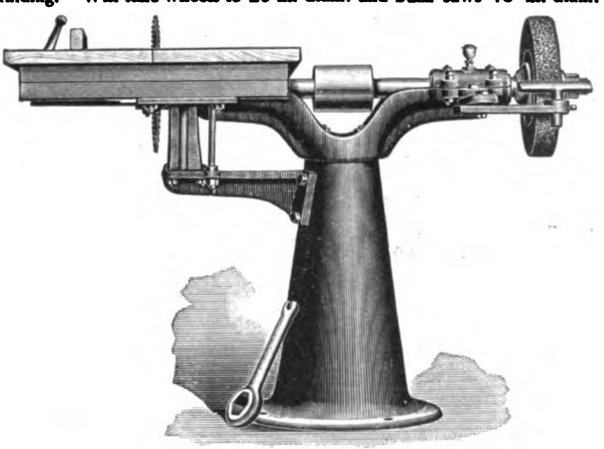
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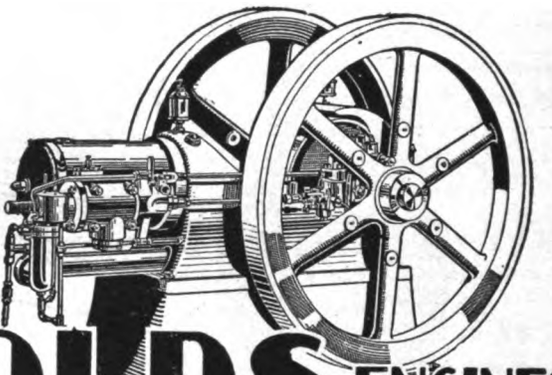
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and BORAX--ETTE.

BORAX-ETTE FOR STEEL TRADE MARK
A PERFECT WELDING FLUX
PREPARED ESPECIALLY FOR WELDING
FAR SUPERIOR TO COMMON BORAX

BORAX-ETTE makes steel weld easily. It does not have to be applied between the laps like other compounds, but is used the same as borax. It has no equal for all kinds of steel welding.

SAMPLES FREE.

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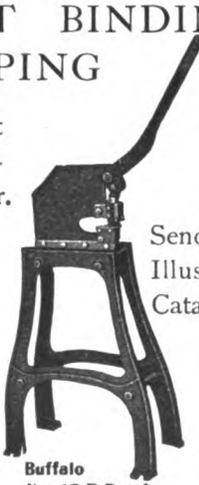


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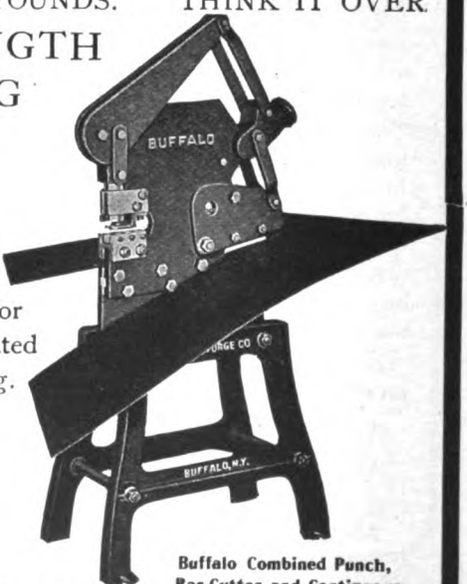
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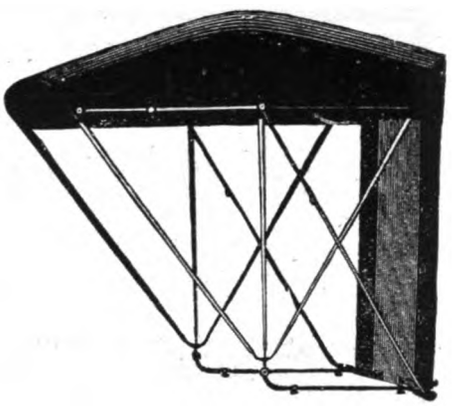
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If we make it, you know it's right—and when we sell it, we sell it right—we save at least one man's profit and give you the benefit.

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CRAY

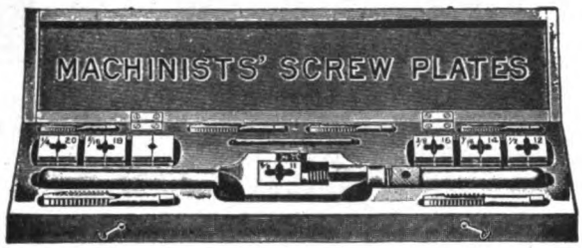
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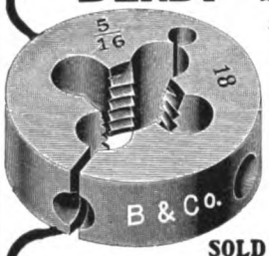
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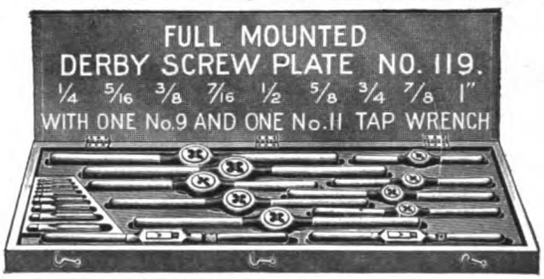
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In the printing, binding, wrapping and much handling of thousands upon thousands of copies of "Our Journal," it is inevitable that occasional poorly printed, bound or otherwise imperfect copies should be mailed. And this even with the very rigorous inspection at all stages in the making of the paper. If, Mr. Reader, you ever receive a seriously defective copy, we will appreciate if you will return it, and we will see that you get a good, perfect copy in return. This is simply another link in our chain of satisfactory service to subscribers.

It is again necessary for us to call attention to the fact that no unsigned manuscripts will be published. When you submit an article or letter for publication, put your name on it somewhere for identification. This is, of course, not necessarily for publication. We believe every reader will understand the reason for this, and will not question our rule of refusing to publish any unsigned manuscripts and letters. If you do not desire to have your name published in connection with your letter or article, simply say so, and the editors will be guided accordingly.

We have made a number of requests recently, and here is another. We have always reproduced a poem on the "Heat-Sparks" page, and to make this feature still more interesting we ask our readers to submit copies of their favorite poems for reproduction here. We cannot, of course, promise to publish every single poem submitted, but we will publish every piece of verse that proves suitable. In connection with these requests, we wish to say that these are made to each reader personally. We don't want you to consider it a general appeal, or a request that is meant for the other fellow, but we want you to consider it as for your very self. We want you to feel that this means you.

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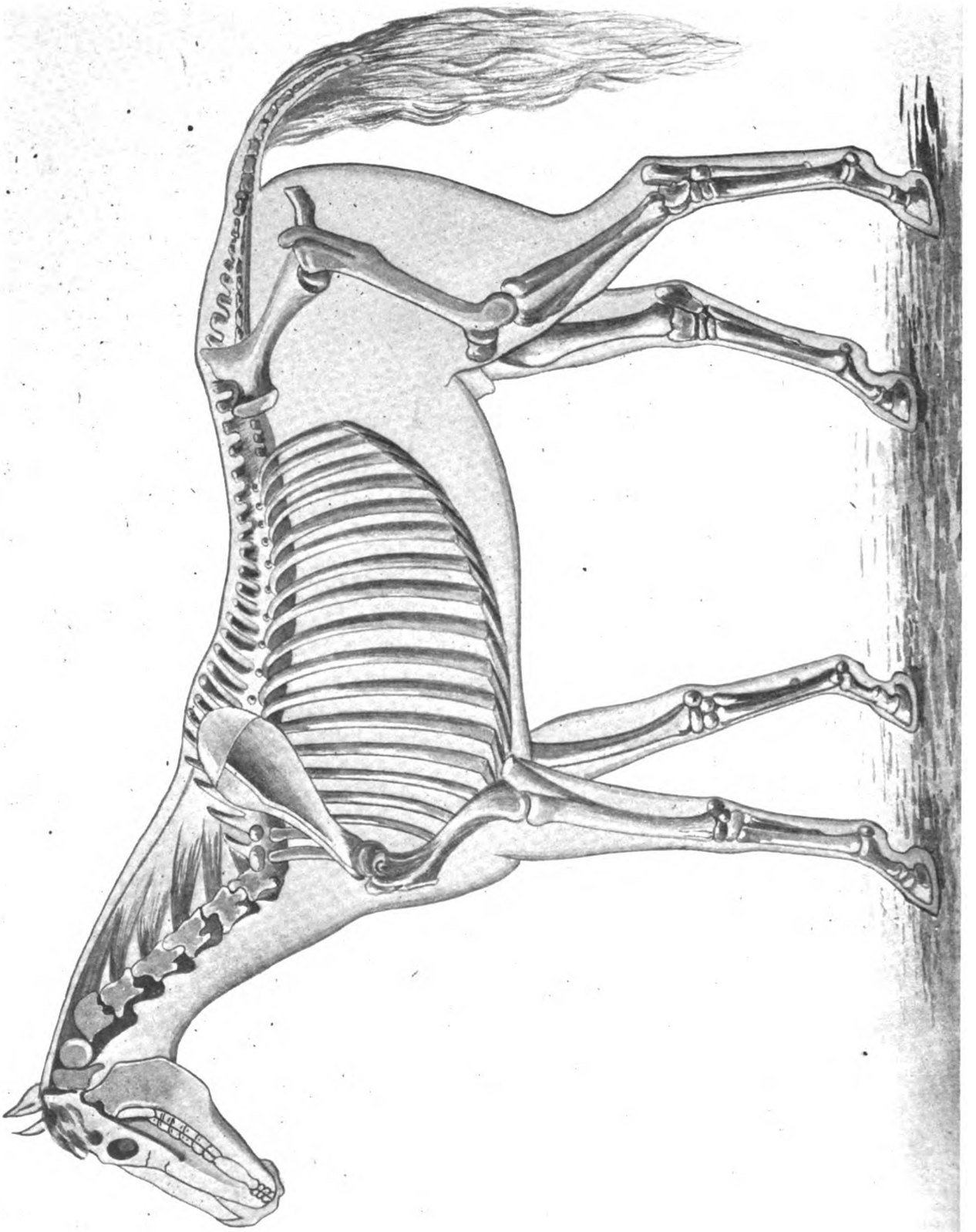
A little matter was brought to our attention the other day; that of a reader who had saved every one of his copies of "Our Journal." He looked them over during his spare time, but further than having good craft reading at his disposal at all times, he considered them—these back numbers of no very special worth. Until, one day a special job came into the shop which was very much of a puzzle, but which he remembered as having been explained in one of the early numbers of "Our Journal." To quote his own words "I was able to do a job which brought me $6.00 for less than two hours' work, which I would otherwise have lost but for THE AMERICAN BLACKSMITH." Every item appearing in the pages of "Our Journal" may not appeal to you now, especially, but file your copies for future reference, keep them handy. They are sure to prove valuable in future work.

We cannot square things if we do not know what to square. If you have a complaint to make, make it today. How do you suppose we can straighten out a kink in our dealings with you if you don't tell us there is a kink? If there is any complaint to be made, complain to us, direct. Don't tell your neighbor about it, but come right straight to us with it. We insist upon fair and square treatment all around, and we certainly want our readers to be treated right in their dealings with us. If you are not getting your paper regularly, let us know it. We cannot right a wrong without knowing about the wrong.

To Our Canadian Readers.

By reason of the advanced postage rate on all second-class mail matter for delivery in Canada, the yearly subscription price of THE AMERICAN BLACKSMITH, to Canada, will be advanced to $1.50, after May 8th, 1907. We would therefore have our Canadian readers bear in mind the advanced rate when sending in their renewal subscriptions. Of course, all present subscription obligations will be filled, regardless of the very material postage advance, or the time the subscription order was received.

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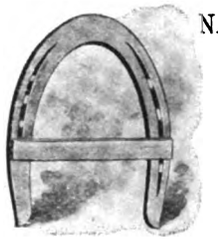


THE ENTIRE SKELETON OF THE HORSE SHOULD BE FAMILIAR TO THE MODERN SHOER, WHILE THE ANATOMY OF THE FOOT AND LEG SHOULD BE MADE A SPECIAL STUDY

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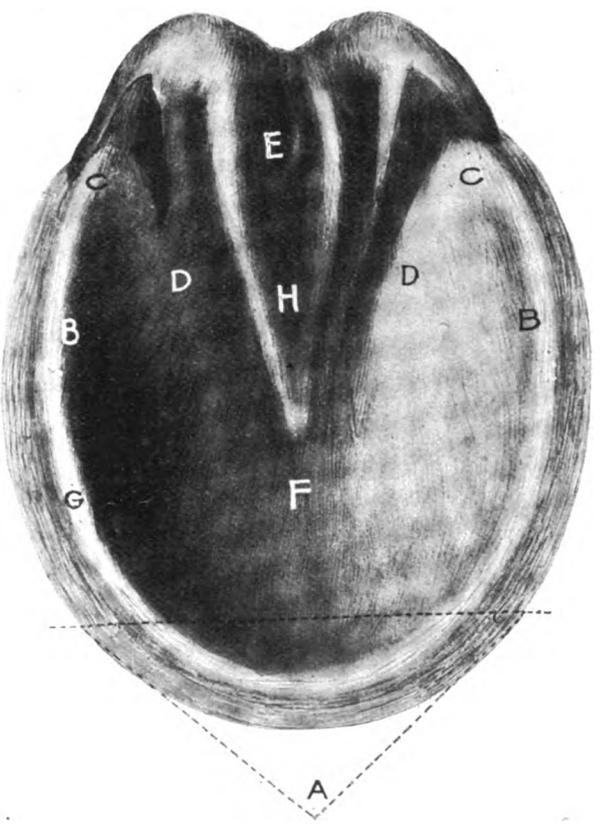
Correct Horseshoeing and the Questions to be Considered by the Shoer

W. O. JULIUS.



NATOMY of the horse's foot and leg, and correct horseshoeing, are so very closely linked as to make the study of the former indispensable to the practice of the latter. The pressing need of a better, fuller, and broader knowledge of anatomy is shown only too frequently by the careless and indifferent shoeing which results in diseases of the feet and irregularities of the gait. And, with the pages and volumes that have been written upon this very subject, there are still thousands of smiths who have little knowledge of the anatomy of the foot. They seem never to consider anything but the exterior appearance of the foot, and this many times in a cursory way only. The feet and limbs of a horse are too important, and their relation to correct shoeing too vital, to permit only passing attention. The relation of the shoe to the foot, the foot to the limb, and the limb to the body is of much concern to the practice of correct horseshoeing. An examination should be made of the animal to ascertain the direction and position of the limbs, the shape, character, and quality of the hoofs, the form, length, position and wear of the shoe, the number, distribution, and direction of the nails, the manner in which the foot leaves the ground, its flight, the manner in which it again touches the ground, and any and all other peculiarities. The animal must be observed at rest and in motion; from in front, behind, and from both sides.

Let us consider the examination of an animal for correct shoeing. We stand before the horse and note the slant of the pasterns. Are they perpendicular, or do they slant inward or outward? Imagine a line being dropped through the long axis of the pastern to the ground. It should pass through the middle of the toe. If, however, it passes through the inner toe it indicates that either the outer wall of the hoof is too high or the inner wall is too short. If the line falls through the outer toe, the inner wall is too long or the outer wall is too short.



A, B, C—The wall of the foot.
A—The toe.
A to B—Side-wall.
B to C—The Quarters.
D—The Bars.
D—The Bars.
E—Cleft of the Frog.
F—Body of the Sole.
G—The white line.
H—Body of the Frog.

THE SHOER SHOULD BE THOROUGHLY FAMILIAR WITH ALL PARTS OF THE HEALTHY FOOT

We now view the animal from the side. Here we note the relative size of the hoof as regards the height and weight of the animal. We also note the slant of the long pastern. Is it the same as the toe, or does the foot-axis break at the coronet? If the foot-axis breaks forward, the removal of horn should be from the quarters, so as to drop the foot backward, and get the toe axis in line with the axis of the long pastern. If the foot-axis breaks backward, the removal of horn is from the toe, so as to drop the foot forward.

The feet are now raised and carefully examined as to outline, form, and quality. The frog is carefully noted, the form and wear of the shoe, distribution of the nails, the widthof the shoe, and any and all particulars that will aid in correctly shoeing the animal. The shoer must ask himself if the shoe corresponds to the form of the foot, if it has been nailed on crooked, if it is too short, too wide, or too long. Do the nails interfere with free expansion at the heels? Are the nails too large? are there too many? are they driven too high? or do they come too near the sensitive tissues? The wear of the shoe is important. Examine the old shoe very carefully; its pointers are valuable and should not be disregarded.

When observed at a walk or trot, note the gait of the animal—how the feet break over, how he carries his feet, and how they are placed on the ground. Note these points carefully in your mind and remember them. After the examination of the animal the foot may be prepared for the shoe.

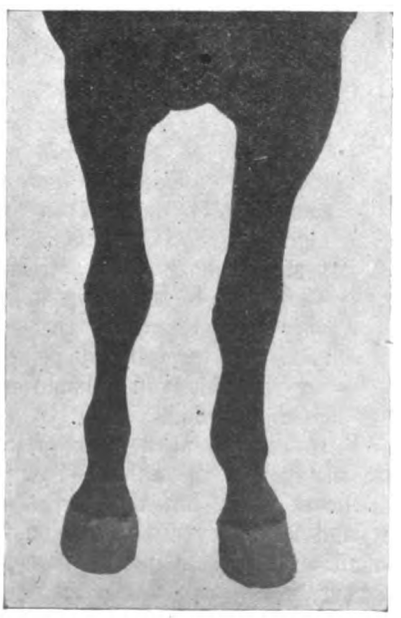
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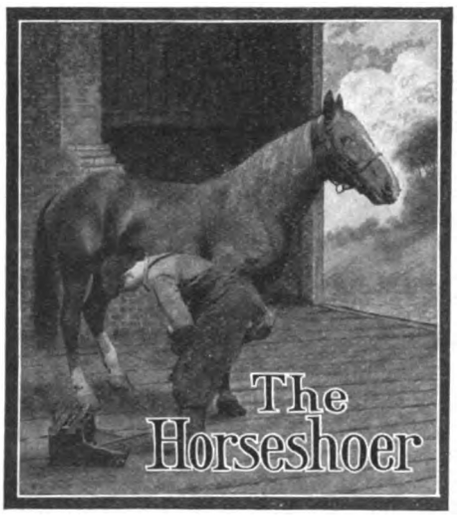
THE POSITION OF THE HIND LIMBS MUST ALSO BE CONSIDERED BY THE SHOER

The old shoe is carefully removed, and the foot dressed or trimmed, according to the deductions made in the examination. Remove horn only after you know that it should be removed—know why before commencing to cut. Don't cut too much or too little—either is a mistake that may result in injury. The foot should be leveled with a rasp until the full thickness of the wall is reached and the white line is distinctly visible. The bars, if too long, should be shortened, but never pare them on the side. The frog should not be touched with a knife further than to remove the loose layers and ragged pieces. This part of the foot usually takes very good care of itself without much aid from the shoer. The frog should project below the level of the wall, so as to have free play, and to bear slightly on the ground. Before nailing on the shoe, round the sharp lower border of the wall with a rasp, so the edges may not be broken so easily.

The shoe should conform to the shape of the hoof as near as possible, provided the hoof retains its natural shape. In diseased or unnaturally shaped feet, a good rule is to give the shoe such form as the foot originally possessed. The thickness and weight of the shoe should be such as to make the shoe last about four weeks. The nailholes should be confined to the front half of fore shoes, while in the hind ones the nails may occupy as much as the first two-thirds of the shoe. In medium-weight shoes three in each branch are sufficient.



NOTE THE SLANT OF THE PASTERNS AS YOU STAND BEFORE THE ANIMAL



In shoeing interfering horses I notice that most writers say to cut down the outside of the foot the lowest, and raise the inside, if they have to use leather. For myself I don't believe in this method. Having a little experience in the business for 63 years, and still shoeing every day at the age of 78, I think I know how to shoe most anything that wears shoes. I have a standing offer that if I can't break a horse or mule of interfering in shoeing him twice, I make no charge for shoeing. I have not found one yet that I didn't cure. My plan is first to stand in front of the animal, and see how he stands on his feet. Then dress the foot one-fourth to three-eighths of an inch lower on the inside than the outside, and set the shoe natural. Use a plain, common shoe, and I know from experience that it stops interfering. G. W. BIGELOW.

Shoeing for Seedy Toe.

E. W. PERRIN.

Another case of seedy toe, or separation of the wall of the hoof, has recently come under my notice and is the worst case of the kind I have ever seen. Seedy toe consists in a separation or fissure between the inner and outer layer of the wall of the hoof, the fissure being filled with a seedy substance, hence the name "seedy toe." The disease is not necessarily confined to the toe of the hoof. It may occur at any part of the wall. The reason that it is met with more frequently at the toe is because of the toe clip being driven too tightly to the wall. The resulting pressure cuts off nutrition to the inner layer of wall and sets up the disease.

Some veterinarians claim the germ theory as a cause of this disease, but my experience leads me to the conclusion that its causes are purely physical. I have always cured it by mechanical means. Among the common causes of this disease are a poor quality of hoof, superinduced by disease, hence it is frequently met with in feet that have deteriorated as a result of an attack of laminitis; injuries to the hoof from concussion or the pressure of tightly driven clips; from injuries to the coronet; from neglected pricks in shoeing; from the introduction of gravel, glass, or other foreign substances, which may work their way up between the two layers of horn; and, last, but not least, the use of shoes which impose the whole weight on a narrow margin of the wall.

The beginning of "seedy toe" is generally a very insignificant affair. It may begin with a small fissure between the inner and outer layer of wall, and the shoe covers it up. At this stage of the disease it causes no lameness, and the shoer usually pares out the cavity, which at first may be not more than an inch deep; perhaps he packs the cavity with tar and oakum, perhaps not. This paring out process is repeated at each shoeing, until finally the depth of the cavity or perhaps the appearance of lameness, attracts unusual attention and

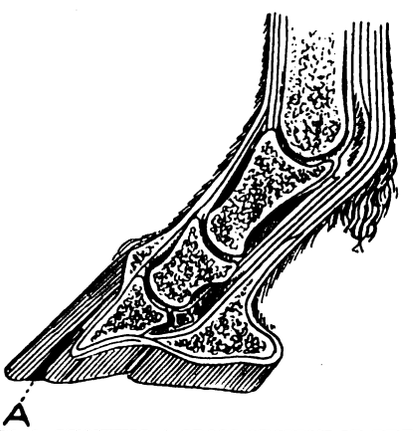


FIG. 1—SHOWING A CROSS SECTION OF THE FOOT WITH THE SEEDY TOE AT A

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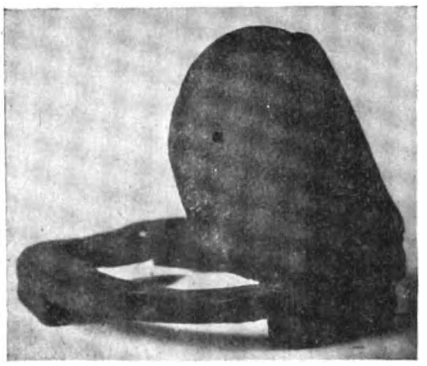


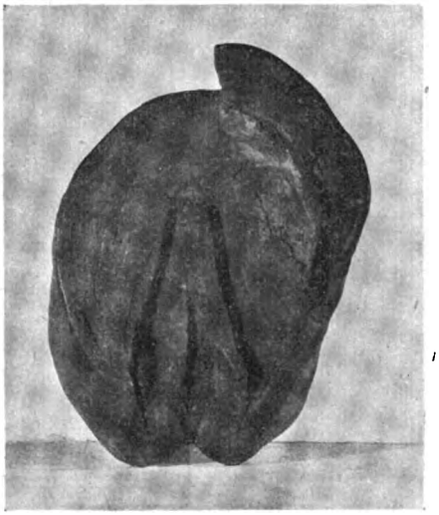
FIG. 2—THE DENUDED TOE IS PROTECTED BY A SPECIAL SHOE

an effort at treatment. Leaving the weight off the affected part and packing the fissure was the old treatment, and I once carried out this mode of treatment on a case under orders from a veterinary surgeon for over a year, without a particle of success. The trouble is that once the cavity is of sufficient size to hold packing, the packing itself, with the pressure of earth below it, becomes a wedge, which continues to deepen and widen the cavity. The progress of the disease is very slow, but finally it reaches the stage where lameness is permanent.

If the case is not complicated with the deformity resulting from laminitis, the cure is simple. It consists in dissecting away the outer wall as high as the fissure extends. Don't be afraid to cut away the wall, even though the fissure extends to the coronet, which can be easily ascertained by tapping the wall lightly with a shoeing hammer. The sound emitted will be hollow as far as the fissure extends. If lameness be present, with or without suppuration, it may be necessary to get the services of a veterinary surgeon. If one is not available, having first dissected away the outer wall, cleanse the part with hot water, and poultice with antiphlogistine until all lameness has subsided; the foot is then ready to shoe.

In shoeing such cases, two important factors are necessary: first, to relieve the affected part of weight; and second, to protect the part denuded of wall from injury. To accomplish the first, a bar shoe is necessary, with nailholes round to the very points of the heels, so as to nail the shoe securely without nailing near the injured part. To accomplish the second, take a piece of band iron wide enough to cover the part affected and weld this on at the toe or quarter as the case may require. (See Fig. 2.) Paint the unprotected inner wall with pine tar, cover it with a layer of cotton, then nail on the shoe. Repeat this treatment at each shoeing. If the new wall as it grows down shows signs of separating, don't hesitate to dissect it away The diseased wall being relieved of concussion will commence to grow down solid. It is then simply a question of continuing this method of shoeing until the new hoof grows down to the plantar surface, which may take from three to six months, according to the extent of the fissure.

In the case which forms the subject of this article, the wall was separated from the inside toe round to the outside heel, and within an inch of the coronet, with a drop sole resulting from laminitis. This horse had been lame for months. In January I stripped off all the separated wall, made a bar shoe which I nailed round to the points of the heels, the same as you



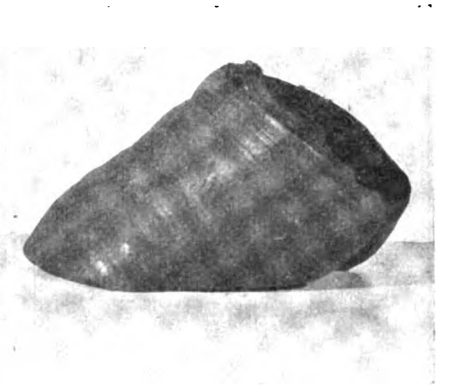
BOTTOM VIEW OF COLT'S FOOT, HALF PARED TO RECEIVE THE SHOE

would do a racing plate. I welded on a plate to protect the part denuded of wall, and there was a marked improvement from the first. In February the animal went to work. I reshod him a few days ago for the third time, and all lameness has subsided. It will take another six months for the new wall to reach the ground surface, but for work he is all right. In all such cases where you have dissected away the outer wall be careful to protect the denuded part with an iron plate, otherwise a glass bottle or other sharp instrument might do serious injury to the sensitive lamina which lies just beneath the inner layer of soft horn.

Dressing the Foot Properly.

A. F. LIBBY.

The tendons and ligaments of the foot are so constructed as to keep the pedal bone level, and are in no way



THE COLT'S FOOT GROWS ABNORMALLY AT THE TOE AND MUST BE PARED

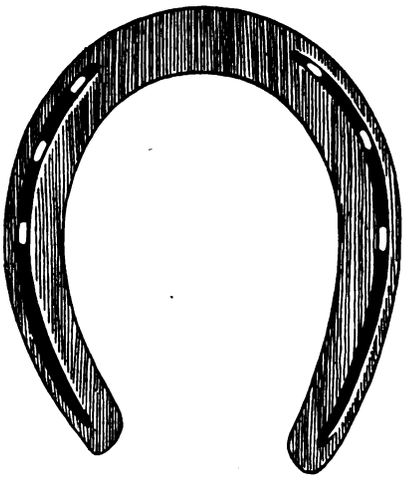
connected with the outer shell. This outer shell is fastened to the pedal bone by two sets of plaits or leaves, the sensitive and non-sensitive laminae.

A perfect foot, if there were no expansion when the horse is in motion, would be 45 degrees in front, and 70 degrees at quarter. But on account of the growth and lateral expansion of the foot we place the front from about 48 degrees to 53 degrees, and 70 degrees at quarter, when first shod. For the benefit of those who may not understand this degree work I shall explain more fully. In any circle we have 360 degrees. Draw a 6-inch square, and mark an arc with your compass from one corner. Then you will have one quarter of the circle in the square, or 90 degrees, it would take four squares to complete the circle, or it will take four such arcs of 90 degrees each to complete the circle and make 360 degrees. A perfect foot sets so as to balance the shoulder. Returning to the pedal bone at the quarters it becomes straighter, so that it stands nearly 70 degrees. A line drawn half way between 45 degrees and 90 degrees would equal 67½ degrees, which would be a perfect foot, by making the allowance as we make on front of foot for growth would equal 70 degrees at quarter.



CONSIDERABLE HORN MUST OFTEN BE NECESSARILY REMOVED

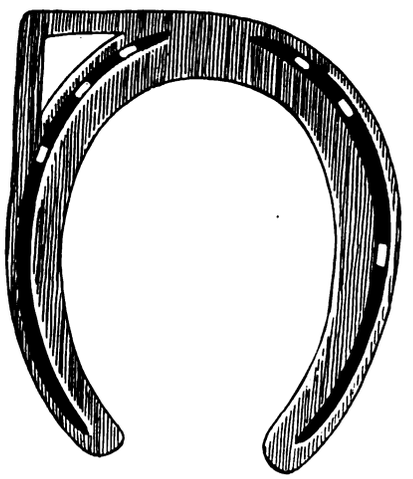
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A COMMON FRONT SHOE OF EXCELLENT FORM

In the perfect foot you will find the length of the frog to be the same as the front of the foot, and from point of frog to point of toe would be the height of heels. This kind of foot will go with any common shoe.

We find certain faulty actions in feet that are sound which can be remedied by applying these rules. For instance:—If the horse lingers



A SIDE-WEIGHT SHOE WITH SIDE EXTENSION AT TOE, ESPECIALLY GOOD FOR KNEE-HITTERS

in his stride you will find his toe long, and heels low. Either shorten the toe in front, or put on a rolling motion shoe, or set toe-calk so he will tip over on the square, which is the same as setting the web of shoe. If, on the other hand, his action is high and choppy, his foot is steep and heels too high, cut down the heels, and give him a tight toe weight. In most cases good horses with these troubles, if there has been no change of structure, shoe from this plan, and the feet will return to a normal condition.

I wish to say a word as to the normal center of gravity in a foot. It should strike the center of bearing in the pedal bone. On a foot with a 6-inch ground-bearing surface this would strike the frog one inch from point of frog, if frog were four inches long. That one inch on the frog in front of center added to the distance from point of frog to point of toe would balance the distance from center to heels. The center of gravity in a pony's foot with a 3-inch ground bearing surface should strike ½ inch from point of frog. The engravings show how a pony's foot is properly pared. The hoof pictured shows half natural growth, with the other half correctly pared.

Corns and Gravel Bruises.

ROBERT MOSER.

Shoeing or no shoeing, 95 per cent of the corns, gravel, bruises, and the like are caused by hoof deformities, though these are often of imperceptible form. For instance: heels develop crooked, and are incorrigible, natural results of prior neglections, from horse-breeders and accidents. Though not necessarily contracted, they are still inclined to corns, and as erroneously called, gravel bruises. Science proves that both normal and abnormal heel developments are equally liable to contraction: each may or may not become affected, and with the exception of some peculiar forms of inherited contraction both may suffer complicated troubles. Hoofs are contracted when deprived of their natural spring, self-expansion and contraction, which ranges from $\frac{1}{16}$ of an inch, up to $\frac{5}{16}$ of an inch. This is naturally confined to and perceptible in the rear-center of the frog, due to animal's weight. Interruption of said expansion immediately causes trouble in the feet and even the joints. Tendon troubles are incurable in contracted hoofs, hence so many similar cripples. All veterinary experts agree that physiology is a most important branch of science, but the least understood. Foot anatomy without physiological hoof-study is incomplete science.

To remove ordinary contraction and corns and other heel troubles is to bring proper nourishment to numberless small and inactive absorbing organs. Natural hoof-expansion is the key to successful hoof treatment, and requires either natural shoeing, or none at all. Whatever else reaches the heels air and water must gain access to hoof-soles. There must also be a persistent use of properly applied hoof-expanders, and daily exercise never fails, even in chronic cases.

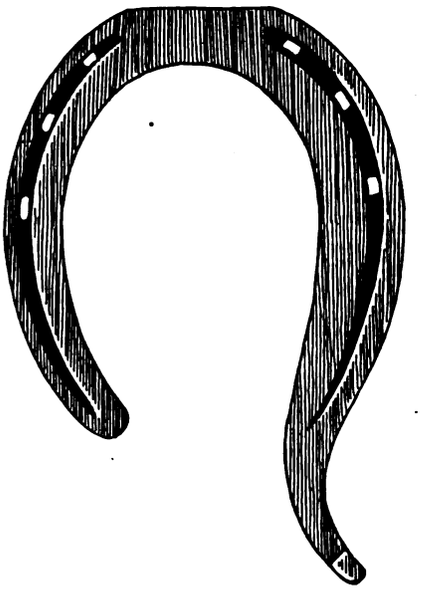
Such shoes and practices as will allow the heels to expand easily and freely are of course always commendable on feet prone to contraction.

The Use of Alcohol and Gasoline in Gas Engines.

C. E. LUCKE and S. M. WOODWARD.

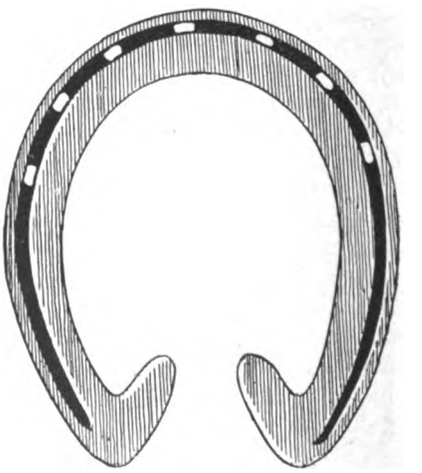
Sources of Power.

There are two great sources of power and an infinitely varied series of mechanical devices and machines for the generation of power. Water power always has been used, and probably always will be used so long as the rain falls, but it is insufficient for our present



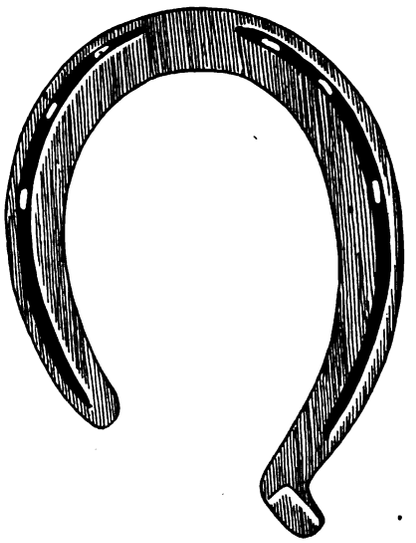
A SQUARE-TOED SHOE FOR CROSS-FIRING—OUTSIDE PROJECTS BEYOND WALL AND IS LONG AT HEEL

needs or geographically unavailable. The greatest source of power is fuel. Fuels may be divided into two series—those that now exist in the form of natural deposits and those which are being produced continuously. All of the coals, hard and soft, with the lignites and peats, the crude oils and



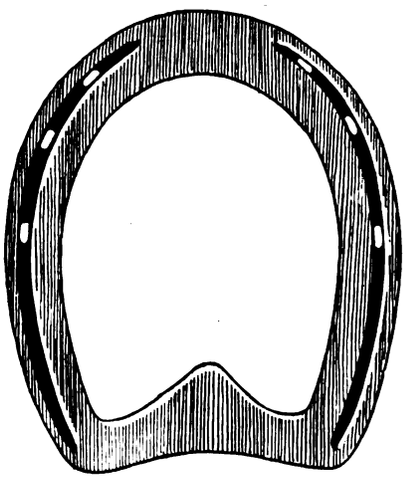
A DOUBLE HALF-BAR SHOE FOR CORNS AND CONTRACTED HEELS

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A VERY GOOD STYLE OF HIND SHOE FOR INTERFERING

natural gas, exist in the form of deposits; and, while it is true that the decay of vegetable matter may be today forming more deposits of the same nature, it is equally true that we are using the present supply faster than the rate of production. The newest fuel for power purposes is alcohol. This is made from the yearly crops of plants. There is in exist-



A BAR SHOE FOR A FRONT FOOT

ence no natural deposit of alcohol, but in a sense it may be said to be possible to produce inexhaustible supplies.

It is only within recent time that engineers have known how to build engines that would produce power from alcohol; and still more recent is the further discovery by engineers that this power can be produced at a cost which may permit its general introduction.

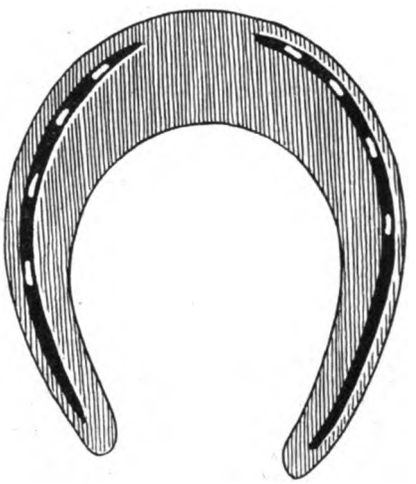
By far the largest part of the power now being used comes from steam produced by the use of coal. This is chiefly due to the fact that as a rule whenever it can be used it is cheaper than possible substitutes, although it is partly due to the fact that steam power is better adapted to some classes of work and is older and better known than power generated by the gas engine in its varied forms. In point of present use, water power stands next to steam in importance. This is largely due to the fact that water power is among the earliest in point of development, but more largely to the fact that it has become possible to transform water power into electrical power, which can be transmitted long distances, and so overcome geographical isolation of the sources.

Next in quantity produced stands power generated by the gas engine. This class of engines includes all machines in which the fuel mixed with air is burned or exploded within the working chambers, whether the fuel be gas produced from coal, natural gas, vapors of any of the mineral oils, vegetable or animal oils, or alcohol. The subordinate position occupied by this source of power is due partly to the fact that engineers have only recently discovered, and are today discovering how best to build these machines, and adapt them to the work they are to do. Wind and wave power stand at the foot of the list and always will, so far as quantity of power developed is concerned. This is because of the irregularity of the sources of supply and their comparatively feeble nature.

Comparative Cost of Power from Different Sources.

The cost of producing power from any of the above sources is made up of a number of items, including interest on the first cost of the installation, depreciation of the apparatus, its insurance, etc., usually called the "fixed charges." To these should be added the costs of fuel, of labor for attendance, and of repairs, as the principal items, and the cost of lubricants, material for cleaning, and a great many other small miscellaneous items, all going to form what are commonly called "operating charges." In all cases where fuel is used its cost is, if not the most important, certainly a very important item. In the case of water power, where the fuel element is zero, the advantage is offset by an interest charge on the cost of installation for dams, pipes, tunnels, shafts, etc.

Assuming that power from all of these different sources is equally well adapted to the particular work to be done, and equally available, then that system will be selected for any particular case for which the cost of power is least. Leaving out of consideration water power, it is found that the labor costs do not differ nearly so widely for the different systems, nor are they so large, as the fuel cost. Therefore, the great question today in power production as regards immediate cost of power and maintenance is this lowering of the fuel cost.

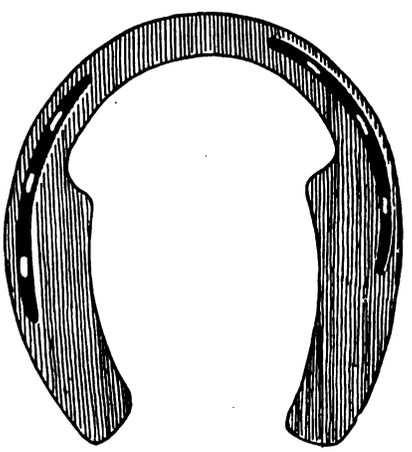


A TOE-WEIGHT SHOE TO LENGTHEN AND QUICKEN THE STRIDE

The cost of fuel per unit of power developed depends, first, on the market price of that fuel at the point where it is to be used, and next, but by no means least, on the ability of the machinery to transform the fuel energy into useful work. If all the different kinds of machinery used for power generation could turn into useful work the same proportion of the energy in the fuel, coal would be almost universally used, because of the present low cost of energy in this form.

Comparative Cost of Energy in Different Fuels.

The different kinds of fuel contain different amounts of energy per pound

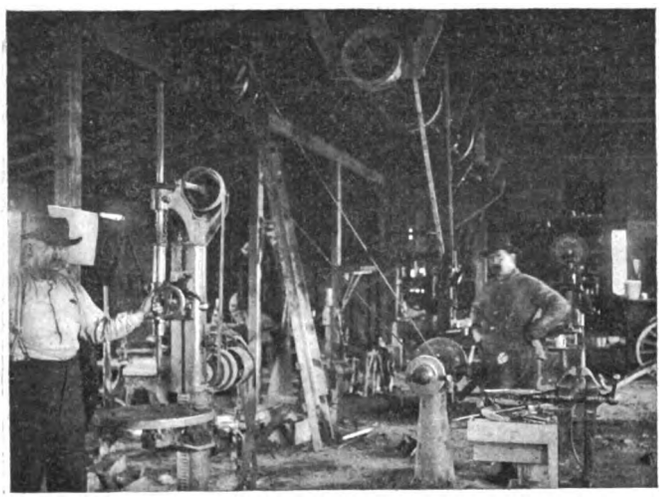


A FRONT SHOE WITH HEELS WEIGHTED FOR SHORTENING THE STRIDE

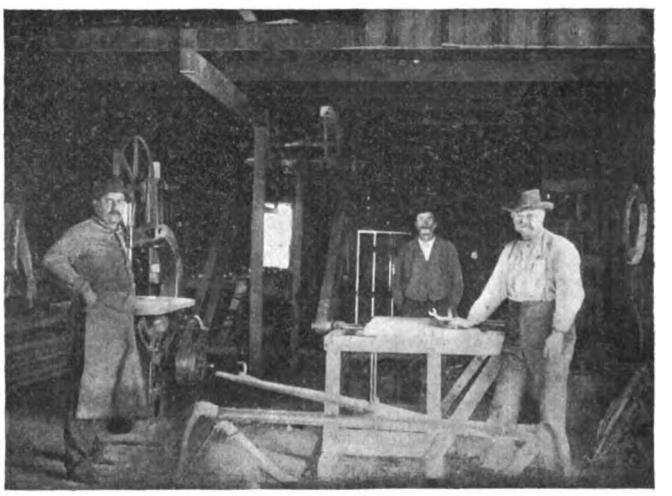
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—that is to say, they have different heating powers. Heat energy is measured in terms of a technical unit called by English-speaking people the "British thermal unit" (B. T. U.). This unit is the amount of heat that will raise the temperature of one pound of water one degree on the Fahrenheit thermometer. In comparing, therefore, the value of fuels for power purposes there must be taken into consideration two facts—the market price of the fuel and the amount of heat which will be liberated when it is burned. Anthracite coal in the neighborhood of New York can be bought in small sizes in large quantities for power purposes at about $2.50 per ton. This coal will contain about 12,500 B. T. U. per pound. This is equivalent to about 10,000,000 heat units per dollar. Larger sizes, such as egg coal, containing about 14,000 B. T. U. per pound, can be bought in large quantities for about $6.25 per ton, which is equivalent to 4,500,000 B. T. U. per dollar. Other grades of anthracite coal and the various grades and qualities of bituminous coal will lie between these two limits of cost. Illuminating gas in New York costs $1 per 1,000 cubic feet, which is equivalent to about 500,000 heat units per dollar. Natural gas in the Middle States is sold for ten cents per 1,000 cubic feet and upward. This fuel at the minimum price will furnish about 10,000,000 heat units for a dollar. Crude oil sells in the East at a minimum price of four cents per gallon, which is equivalent to about 4,000,000 heat units per dollar. Gasoline sells at a minimum price of ten cents per gallon, which is equivalent to about 1,200,000 heat units per dollar. Kerosene sells at from ten to 30 cents per gallon, which is equivalent to 1,200,000 and 400,000 heat units per dollar, respectively. Grain alcohol, such as will be freed from tax under the recent legislation, will sell for an unknown price; but for the purpose of comparison, assuming 30 cents per gallon as a minimum, it will give 270,000 heat units per dollar. Gasoline, kerosene, crude oils, and, in fact, all of the distillates, have about the same amount of heat per pound; therefore, at the same price per gallon, ignoring the slight difference in density, they would deliver to the consumer about the same amount of heat per dollar, whereas the other liquid fuel, alcohol, if sold at an equal price, would give the consumer only about three-fifths the amount of heat for the same money. From the figures above given it appears that the cost of heat energy contained in the above fuels, at the fair market prices given, varies widely, lying between 200,000 heat units per dollar and 10,000,000 heat units per dollar. It is possible to buy eight times as much energy for a given amount of money in the form of cheap coal as in the form of low-priced gasoline, or twenty-five times as much as in the form of high-priced gasoline or kerosene. This being true, it might seem to a casual observer as rather strange that gasoline should be used at all, and the fact that it is used in competition with fuel of one-eighth to one twenty-fifth its cost shows clearly that either the gasoline engine has some characteristics not possessed by an engine or plant using coal, which makes it able to do things the other can not do, or that more of the heat it contains can be transformed into energy for useful work. Both of these things are true.

(To be continued.)



THE INTERIOR OF THE BLACKSMITH AND MACHINE SHOPS SHOWS A GOOD LINE OF POWER MACHINES



THE INTERIOR VIEW OF THE WOOD SHOP DOES NOT SHOW THE EMERY STAND OR THE WOOD PLANER

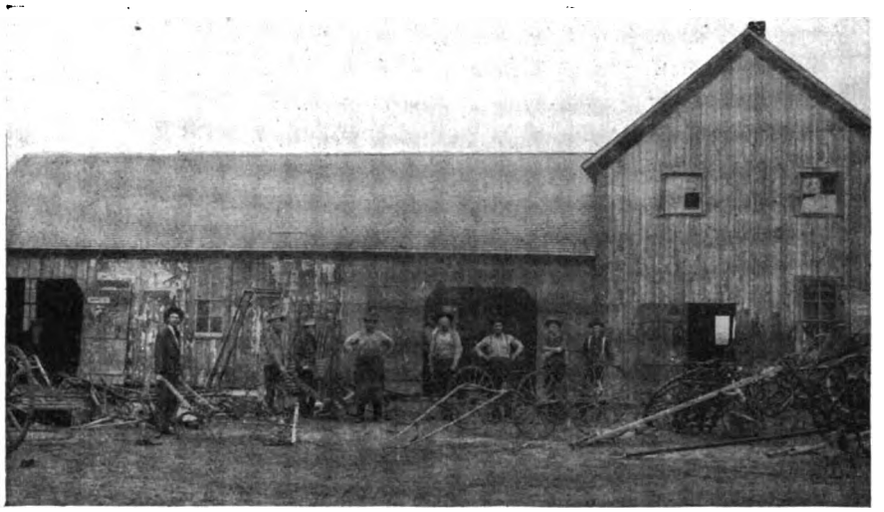
Price Most Essential in Smith Work.

J. B. WEIMER.

Getting the just recompense for the work we do is more essential than knowing how to do the work. Certainly it is necessary and right to know how, but to get our reward is the mainstay just the same. We should have laws enacted compelling work to come up to the standard, and with the pay. Botch smiths, not good mechanics, are usually the ones that do the price-cutting and the poor work. There is certainly as much responsibility connected with the trade as there is with other professions. Suppose a "botch" repairs a doubletree, singletree, neck-yoke, or anything about a conveyance, and this work proves defective and as a result the horses run away. Someone is likely to be killed or hurt, to say nothing whatever of the damage.

I started at the trade 12 years ago, and today I do all kinds of "white smith" work in general. I make all kinds of springs, do all kinds of rim repairing, revolvers, bicycle repairing, fix automobiles, and all the different parts. I make the parts from the raw material. I braze muzzle-loading and breech-loading shotguns, rebore them, put extensions to barrels and re-rifle guns. I make my own tools, such as dies, taps, and materials for casting type. In short, my slogan is, "If you have anything that you are sure that I cannot do, give me a trial." I am in a town of about 950 inhabitants, which is a very small place for so much work

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VEHICLE AND IMPLEMENT WORK SEEMS TO BE THE PRINCIPAL PRODUCT OF THIS WELL-EQUIPPED TEXAS SHOP

that comes in the "whitesmith" line, but am getting lots of work from the surrounding towns. Have not done any advertising as yet, consequently I am very well pleased, considering everything. But I say, let's have laws to make workmanship and prices come to a standard. United we stand, divided we fall.

A Well-Equipped Texas Shop.

W. A. WALTHALL.

The accompanying engravings show both the interior and exterior of my shop. We do all kinds of general work, and have a very up-to-date equipment. We have a band saw, a wood planer, a wood lathe, an emery stand, a power hammer, a metal planer, a large power drill, all run by a 6-horsepower Weber gasoline engine. The floor space in the blacksmith and machine shop is 34 by 50 feet. The floor space in the wood shop is 22 by 54 feet.

Thornton's Letters.—7.

Being "Straight-from-the-shoulder" Talk from a Prosperous Self-made Smith to his Former Apprentice, now in Business.

DEAR JIM:

You're correct in your conclusion, but I knew you would see it that way, too, after thinking about it. You have done work that your men are supposed to do—work that you pay them good honest money to do—work for which they hired out to you. The fact that they all came to you with good records, appear very ambitious, and were very willing, told me as plain as day that you carry more soot home than they do. When a job comes in which the assistant can do, let him do it. If you don't, he will resent it, taking for granted he is made of the right stuff. And he will look for another place, if it continues. You were so afraid of overworking the good men and so afraid of losing them that you drove them away.

Just the other day, on a little trip down the country, I came across a chap who had been a helper to one smith for 15 years, and you should have seen how they took care of work in that shop.

There is also the other extreme, old man. I don't want you to get so blamed swelled up that you can't work with your men. Don't put yourself up on a little shelf all by yourself, but get right down on the main floor. When a rush comes, work, and work hard. Set a good example for the men, but when the busy time is over see that you are the one to lay off, and not one of the other fellows.

No, there is no substitute for a gas engine. Don't for one minute think that you can temporarily use an old-fashioned horse power. You can't do it, Jim, and you won't. That part of your letter referring to horse power reminds me very much of an old Spanish proverb which runs about as follows, "In the blacksmith's house you find a wooden knife." Don't, for goodness' sake, and for the sake of business, have a wooden knife in your shop. If, as you admit, a gas engine will help you very much financially, and in other ways, why won't it help you today? Money placed in the bank next month is not drawing interest today, nor is a gas engine which is installed in the shop next season giving you any assistance this week. This may perhaps sound silly, and you may probably think that I have gone foolish in my old age, but just figure the thing out for yourself, old man, and get right down to dollars and cents. If, as you say, you can dispose of two of the men next spring, when you figure on installing a gas engine, why don't you get your engine right now, and pay for it out of the money you are now turning over to these men?

And an engine in the shop will place your shop in the minds of customers as one that is right up to the minute. I know very well that a gas engine and the machines to be run cost money, but it pays, my boy, and pays well. Lightened labors, increased business, and large profits is where you feel it the most.

If, as you say, there are no power shops in your town, you'd better get



MR. J. P. M'CARTHY OF MASSACHUSETTS MAKES A SPECIALTY OF HORSE-SHOEING AND THE TREATMENT OF HORSES' FEET

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a good engine immediately. When power enters the field, there is little to be feared from competition. Competition is the life of trade, all right, but when the other fellow gets so far ahead that he cannot be seen without opera glasses, there is not much competition, nor has the fellow in front much to fear from the chap behind. If I were you, Jim, I would be worried most to death for fear one of my competitors would install an engine before I did. I wouldn't go to bed tonight without signing an order for one. There are lots of firms who will send one on approval, and I want you to get some catalogues and study up the gas-engine question from beginning to end. Go into it thoroughly. Get all the information you can, and when you have made a choice, and know it's just the engine you want, order it, but not before.

In this connection, I want to speak on another point. I have received a number of letters within the past few months from smiths, complaining about the quality of a machine, or upon a contract with the company selling it. Before you sign a contract for anything read it carefully, and be sure it's O. K. before you sign it. Another little thing which is very timely, considering recent developments in certain quarters of our country. It's about graft. When a salesman for anything from nails to gas engines says something about graft, you can take it that there is something wrong with either the salesman, or the stuff he is trying to sell. The minute he talks in a low whisper, and says something about "A little extra on the side," take him right up to the door and show him how to open it.

You say your side-lines are doing fine. Keep it up, old man, but don't make the mistake of paying too much attention to them. Don't let good customers find all hands busy grinding feed when an axle is to be repaired. Of course, I don't believe your shop is ever in such condition. I just wish to say: Don't overdo the side-line business.

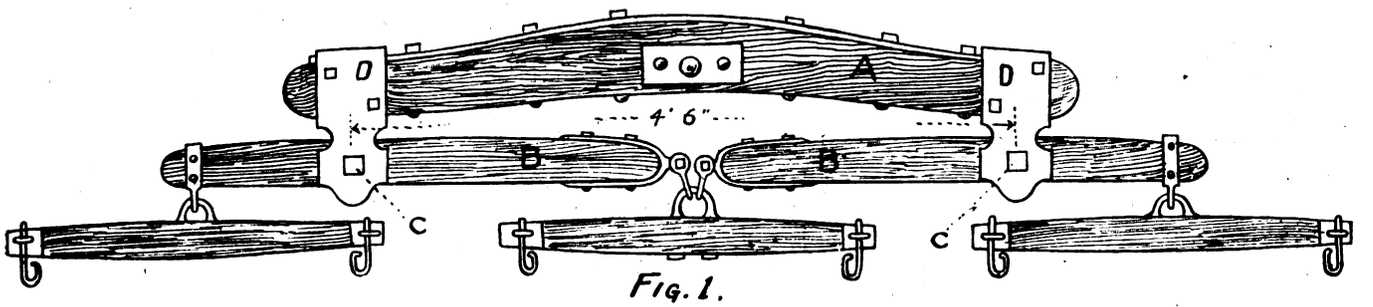


FIG. 1.

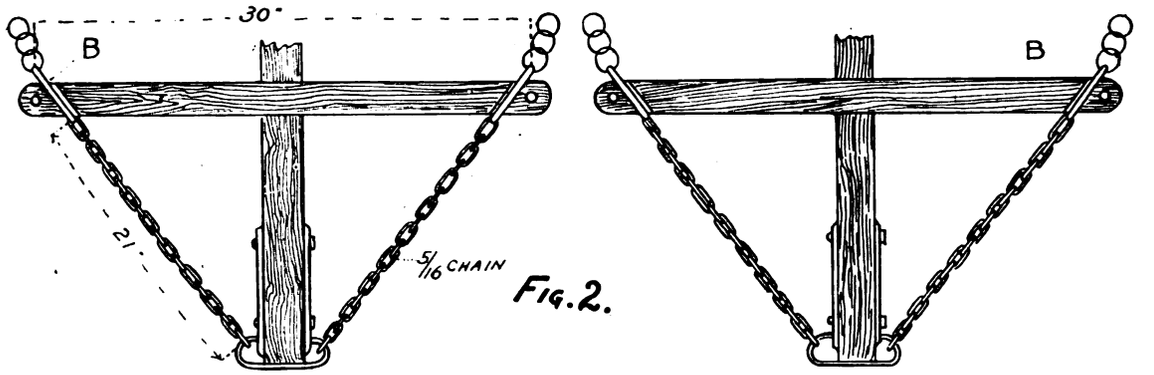


FIG. 2.

PLANS AND MEASUREMENTS FOR CONSTRUCTING A THREE-HORSE EVENER FOR HEAVY DUTY

I am glad to know that your business is growing—no matter how little. Better an oak of slow but sturdy growth, than a mushroom of a night that withers on sight.

Yours,

Thornton

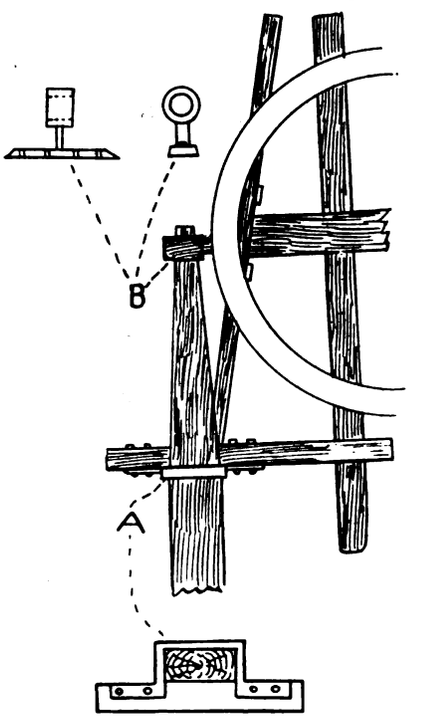


FIG. 3—SHOWING METHOD OF ATTACHING POLES TO WAGON

How to Make a Three-Horse Evener.

N. PETERSON.

In the March issue a reader asks for information on the making of a three-horse evener for pole, and neck yoke for holdback. The question is hardly made clear enough to form an idea for what specific purpose he wants to use it, but assuming that it is to be used on a truck wagon for heavy work, will say that the way they are made in this locality—and there are lots of them used here owing to the hills—is shown in Fig. 1. The doubletree A is made like any other doubletree for a two-horse wagon, except that it is longer, and, of course, somewhat heavier, being four feet six inches long. The eveners B B are 33 inches long, and divided so that two-thirds of their lengths are inside the drawpins C C. The two clevices shown at D D are made of 4½ by $\frac{5}{16}$ inch iron, and, to give to them a neat appearance, the top side is cut out with a gouge and rounded at the points as shown.

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A heavy plate 2 by $\frac{5}{16}$-inch is fitted and bolted to the back of the doubletree, and a hook is to be turned up on each end to keep the clevices in place. These eveners could not be used with one pole only in the center, because the middle horse is placed in front of the center of the wagon, and for that reason two poles are used. Three-horse trucks are sometimes built with a double set of hounds, but any two-horse truck can readily be converted into a three-horse truck and still be available for two horses by simply changing the doubletree and pole. In Fig. 3 is shown the attachment and the way they are put on. A socket A is bolted to the splinter bar and made to fit the pole. Another socket B for the back end of the pole is bolted to the side hound as shown. No neck yoke is used, the pole-chains answering the purpose of holdbacks, the two inside pole-chains shown at A, Fig. 2, being attached to the middle horse. To prevent the chains from pulling the horses together a spreader bar is made, 30 inches long. This is cut down at the ends to fit the long links of the chain at B, Fig 2. A pin is inserted in the hole outside of this link as shown. There are other devices that I could show, but this one is as good as any of them.



"What's your opinion of this apprentice problem?" asked Benton.

"My opinion is that the chaps who stick are going to make a good thing out of the craft." Replied the Editor. "In other words, the very fact that few apprentices are to be had shows that, there'll be a time of few smiths. And when that time comes the apprentices of today will be very much in demand as smiths. And a strong demand with a small supply usually puts the price up."

"Why are not more young men entering and learning the trade?" asked the other.

"Many things are responsible for this," returned the Editor. "In the first place the prospects in other lines are so much more promising on the surface. A young chap, as a rule, looks at the pay first, second the hours, and third the chance for promotion. Figuring on this basis where does smithing stand, except in the promotion line?" Then, continuing, the Editor said: "The hours in the smith trade are long, and the wages offered are small. But were the young man to look under the surface he would find independence and comfort awaiting him in the smith craft."

The Editor paused to take a letter from his desk, and continued, "Here, for instance, is a letter from a smith in Missouri. This man has spent just sixteen years at the trade, and owns his shop, a nice cosy home, with considerable land surrounding it, and says he has all he desires. He also touches on the very point under discussion—the apprentice. He has five men helping him in the shop, and says he has no apprentice troubles, because he treats the boys as though they were his own. He has placed his library at their disposal, and anything he owns is at their service, as far as study and increasing their knowledge of the craft is concerned. They are made welcome at his home whenever they care to come, and are encouraged in every way to make the best of themselves in a trade way, as well as in character."

"Well, this case is exceptional" said Benton, "But, how many smiths care anything about their help as long as the men do the work O. K.?"

"Smiths should care more and feel more responsibility for the future craft in guiding the smiths of the future, not only in a business way but socially as well," returned the Editor. "And when the boys find that the boss is thoroughly and truly interested in them, they will take a thorough and true interest in the business. Someone said at one time that the best ad. a business firm could get was to have its employees bragging about where they work. It's mighty hard to get them to do this but right treatment and proper appreciation will secure such support."

"Yes, but how many employees do you find doing this?" asked the other.

"Just the other day I received a letter from one of our readers," returned the Editor "in which the writer came so close to bragging about where he was employed, that you would think the shop was his own. Well, in fact, he said he considered it as such as far as working for his employer was concerned. He said his work was so thoroughly appreciated that it was a pleasure to work there. Now if this chap goes about town talking like that, he is the best advertising medium his employer can get."

"Well, it surprises me" said Benton. "I didn't think there was anybody working for a firm who would brag about the concern."

"Have you seen the May proofs?" asked the Editor, picking up the rough pages for the May issue, and handing them to Benton.



MR. C. W. METCALF, WHOSE ARTICLES ON HORSESHOEING HAVE PROVEN OF MUCH INTEREST TO OUR READERS

"No, I was about to ask of the May paper," returned the other. "What's your special feature?"

"Shoeing" replied the Editor, "Just glance through it and see what you think of it."

"Looks good to me" said Benton carefully scrutinizing each page. "Those pictures are excellent, and will be the greatest aid to the shoer. I believe this is the best paper yet. And if you continue to improve these pages I don't know where you'll end."

"I think it's a pretty good issue" agreed the other. "And I guess we can go right on improving for some time at least."

"I cannot see how any craftsman would try to do his work without 'Our Journal.' Why, at the low subscription price it's almost like giving the paper away." And Benton continued as though trying to convince the Editor, and get him as a subscriber.

"Guess we'll have to send you out to get subscribers," said the Editor smiling. "You certainly talk convincingly enough, and should be able to persuade some of these chaps that think they don't need a paper to try it. When you get them that far, the rest is easy, for the paper itself will keep them as regular readers."

Menker came in at this juncture and asked Benton if he could give him a recipe for a good iron cement.

"Yes, guess I can," replied Benton, getting out his recipe book. "But perhaps you better ask the Editor."

"No, Benton," said the Editor, smilingly, "you had better accommodate Menker. I didn't think you would take that aluminum affair seriously."

"I want to repair a broken machine part," said Menker, "and a good iron cement will do as well as a lot of troublesome brazing."

"Take sulphur and white lead," said Benton, reading from his book, "and mix equal parts of them together thoroughly with about one-fifth part of borax. When ready to use this compound moisten it well with strong sulphuric acid and spread thinly on the ends to be joined."

Here the Editor brought the talk to a close by giving his attention to a pile of fresh proof from the printery.

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The Blacksmith's Song.

JOHN TALMAN.

This world is full of pitfalls and snares,
Of Lilliput pleasures and Gulliver snares,
With people more ready to curse than to bless,
With little to cheer you, and much to depress.
But the best thing to do is, believe me, I pray—
Face your duty, be brave and keep hammering away.

The pitiful creatures of envy indeed
Will peer or will carp if you fail or succeed:
There are those without number who lack not the will
To give you a kick, once you're started down hill.
Don't let them disturb you, don't mind what they say,
Turn your eyes to the light, and keep hammering away.

Devotion to duty a lever will prove,
Wherewith you can many obstacles move.
You may find that life's gold overmatches the dross,
In striking your balance of profit and loss.
Be steadfast and patient, be hopeful and gay,
To business attend, and keep hammering away.

With the honey of life must some wormwood be mixed,
As the daintiest rose by a thorn is transfixed.
But the honey's more sweet from the leaven of gall,
And the rose rudely pierced the most fragrant of all.
You'll find your reward great and lasting some day,
If strong in your faith you keep hammering away.

Submitted by
D. FOSTER HALL,
Massachusetts.



Killing time spoils more characters than killing work.

Possibilities become realities when backed by firm resolutions.

He talks against his best friend, who talks against the craft.

As for dressing tools, there will be no change in styles this summer.

Every time a man loses his temper there is a circus, with himself playing the clown.

Statistics say that 1,700,000 horse-drawn vehicles were built in this country last year.

At least once a month should the hoof be trimmed, whether or not the shoe is worn out.

"My wife can't bake without THE AMERICAN BLACKSMITH in the kitchen," writes an Ohio smith.

An excellent thing in a tool but a poor thing in a man—temper. Is yours in the right place?

Twenty-two years has one helper been with a York State smith. Do you know of any long records?

Don't let it drive you—drive your business to success. And don't stop this side of the goal post.

Roll up your sleeves—go at your work with a purpose. Determine to accomplish, and 'tis half done.

Train, instruct, and encourage the apprentice. Don't be indifferent to him. Show an interest in his work.

For, by, and with the smith is "Our Journal." Recommend it to your brother craftsmen as a good thing.

Cut the price, and you cut the profit every time. Isn't your end of the selling price already small enough?

A million dollars is the value of the everyday output of the world's copper mines based on present prices.

Do what you do for all you're worth. Whether advertising, working or pleasuring, do it thoroughly and well.

Seems as though the fire waits for the policy to lapse. Keep your eye on the date of your insurance contract.

Get the habit—of using them freely—of asking for more—of placing a pink buffalo on every letter you write.

Mighty handy is the rubber stamp and ink pad we give for new subscribers. Ask about how to get it—it's free.

Advertising doesn't pay? Then why hang out a sign, talk about your business, or use neat business stationery?

The early bird—don't let your competitor find you napping these days. Keep eyes and ears open to every opportunity.

The best time to carefully examine the gas engine is after the day's run, when you wipe it clean. Of course, you have an engine.

Some smiths kick for any reason, and others for no reason, but when the horse they are shoeing kicks they use the hammer or rasp improperly.

"A rolling stone gathers no moss", replied friend Tom when asked why he didn't get a better shop. T. T. evidently believes in getting mossy.

At the tips of your fingers, your business should be. A good system will enable you to know always just what you are doing in a business way.

'Tis not always easy, but try it. Turn out your work a little earlier, and a little better than is called for. 'Twill prove a mighty factor in your success.

Fatten your purse with a side-line. You'll find hints without number in these columns. If you already make a good profit on the side, tell us about it.

Be thoroughly interested in your business, and your business will be thoroughly interesting to others. People like to trade with a full-of-business man.

A sure winner—a modern smith with modern tools in a modern shop with a modern paper always handy. Of course, we mean THE AMERICAN BLACKSMITH.

"How does the garden grow?"—Don't let your life be all iron and hoofs; mix in a bit of nature. If you haven't time, get the children interested in a garden plot.

Profits, losses, expenses, costs—do you know them? Systematic methods will tell you. No business is too small or too large for a good system of getting at these facts.

Careless methods—how many business failures are the result of them! How many men are now courting failure! Every duty should be characterized by thoroughness.

Just think of it—we'll send to anyone you name, "Our Journal" one year, and give you six months on your own subscription for but one dollar. A dollar bill will do today.

"If all shoers would treat a horse as they themselves would like to be treated if they were horses, you wouldn't be able to find a lame horse with a spy glass," says Thornton.

Money saved today bears interest tomorrow—why not get the interest, too? Organization means better prices—more money—a worth-while saving. Write to the Secretary. Will you do it today?

Run over to your neighbor with this very copy now. 'Twill take but a minute to show and convince him that "Our Journal" is mighty valuable. Every single order helps toward the fifty thousand mark.

As easy to grow roses from tomato seed as to prosper when continually talking hard times and poor business. Think, talk, and act success, and reap a like harvest. It doesn't pay to be a gloom distributor.

"Give me a drop or two, will you?" squeaked the old rusty drill press to the oilcan. "Haven't seen a drop of oil in weeks," replied the other in a hollow voice. And all was again quiet in Tom Tardy's shop.

Adamite metal, a new alloy, has been put on the market as a substitute for brass. Its basis is aluminum, but the exact composition is kept secret. In many ways this new composition is superior to brass.

The inventor of the machine for making horseshoes, Mr. R. W. Fuller, died March 11 at Hanover, Conn., at the age

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of 85. 'Tis said that Fuller's invention was copied by others who made millions, while he died poor.

A glass clock has been constructed by a Bohemian. Screws, cogwheels, hands, shafts, wedges, pins, and all except the spring are made of the fragile material. It took six years of almost continuous labor, and is valued at but $625.

Don't stop until you are leader, and don't stop then, either. Good work, business-like methods, a well-equipped shop and advertising will attract trade to your shop. Don't be satisfied as long as there is a single shop in your locality which boasts more trade than yours.

Consider long and carefully before signing any papers, especially for the purchase of machines and equipment. If the price named, the terms of payment, or any other details are not right, don't sign, and then expect the mistake or error to be corrected. Have it O. K. first.

Would you relish such times—those of a hundred years back—of few tools, poor tools, and the days of brawn and hand? Still there are smiths today little better off than their "grandpops", simply because they lack a few up-to-date tools—tools which would pay for themselves, if but given a chance.

"Laugh and the world laughs with you"—Don't be afraid to smile right out loud when something just hits your funny spot. Keep the doctor out of the house, the frown from your face, and sunshine in your heart, with an occasional hearty ha, ha, ha. The sun never sees the dark side of anything.

"It don't pay" said Tom. "I put an ad. in the weekly Bugle once 'bout thirty years ago, but it never paid. Can't make everybody come to your shop. You can get just so much trade and no more, no matter how much you advertise." And friend Tardy locked up shop for the day, though 'twas not yet two o'clock.

An Arizona smith, Mr. John Hughes, says: "Please find enclosed $1.00 for renewal of my subscription. I ought to be whipped for neglecting to send it before, but old age makes me forgetful. I went into the trade in 1851. Your paper is worth $10.00 a year, for it is the best trade journal I have ever seen. I want you to send the paper until I order it stopped, which will be when I cease to exist. And then the party who succeeds me will read it, for I will make it a condition of the sale of the shop." Tell your neighbor.

"Machinery," that excellent New York monthly devoted to the machinery trade, prints the following in their March issue: "The rapid growth of trade journals in recent years is shown to advantage in THE AMERICAN BLACKSMITH, published at Buffalo, N. Y. Though started in October, 1901, the circulation has increased so rapidly that the average for 1906 was 29,000 copies; for the special issue of January 50,000 copies were printed. The reading pages are illustrated with numerous engravings, including many fine half-tones, and the articles are of a thoroughly practical nature, interestingly presented. We are glad to learn that American blacksmiths are alive to the importance of keeping in touch with the best practice of their craft, and the improvements in machinery that are available to lighten their labors and increase their profits, this being evidenced by the liberal patronage which the journal has received."

American Association of Blacksmiths and Horseshoers.

Another letter comes from a Missouri association, and it is most encouraging. The work of organization seems to be progressing just wonderfully in that state. Warren, Lincoln, St. Clair, and Montgomery counties are among those organized. You remember that we published a letter in the April paper which mentions the organization of Lynn, Carroll and Caldwell counties. Smiths in all parts of Missouri state are beginning to see the value of organization, and are proving their beliefs by organizing.

How are things in your county, brother? Pretty near time you get full price for your labor, isn't it? The only lawful way to get it is by organization. Get busy now, right away. There's no time like the present for starting a brisk growing organization in your county. Roads are good, times are prosperous, and weather fine. Why not benefit your community, your craft, and the country generally by forming an association in your county? Never before was the need more apparent. Do you realize the advantages to be gained? Now is the time to get busy, not tomorrow or next week or next year. An association that will benefit your community next season will benefit it today. Why not get all the benefit you can?

Here's another sample of what associations throughout the country are doing. The following is a resolution adopted by the Minnesota state association:

First—We recommend that we extend credit for 30 days, subject to the judgement of the parties extending same, and, at the first of each month, the members of the Association shall render statements to patrons, and, if settlement is not made in 30 days of first charge, the same shall be reported to the Secretary of the Association. And further, that all credit to such party or parties shall be discontinued, until the claim has been settled satisfactorily to the creditor.

Second—That it shall be the duty of the Secretary of the Association to notify each and every member of this Association, of the party or parties failing to pay their account in said time.

I also have another agreed price list. All these benefits can be yours, Mr. Reader, if you will but ask for my easy plans for forming branch associations. Do not let the matter drop here. Reading my letter every month in these columns will not do any good whatever. Sitting in the shop dreaming of the benefits will not better your condition. Action and push are needed. Good red blood is what the association wants. If you will write me today, plans will be forwarded by return mail, and with the co-operation of your neighbor smiths, who knows but what we can have a good strong association formed to reap full benefits of the summer trade. Don't let your request for plans be delayed another day. Anything worth doing at all is worth doing *now*. And it's certainly worth while to form a county association for the protection of your family, your business, and your craft. Address me P. O. Box 974, Buffalo, N. Y. THE SECRETARY.

Horseshoeing.

Four plain shoes	$1.10
Four toed shoes	1.40
Four old shoes	.60
Four old shoes retoed	.90
Toe weight shoes per pair	.65
Side weight shoes, per pair	.75
Plates, per pair	1.00
Plates, tacking on only, each	.25
Shoeing colts, one year and under	1.00
Shoeing stallion	2.50

Plow Work.

Plow sharpening, 1 horse, 6, 7, and 8 in	$ .10
Plow sharpening, 2 horse 12 in	.15
Plow sharpening, 2 or 3 horse 14 in	.20
Plow sharpening, 2 or 3 horse, 16 in	.25
Plow sharpening, 2 or 3 horse, 18 in	.30
extra for taking off stock	.05
Plow shares, 1 horse	2.00
Plow shares, 2 horse, 12 in	3.00
Plow shares, 2 or 3 horse, 14 in	3.50
Plow shares, 2 or 3 horse, 16 in	4.00
Plow mold boards, 12 in	3.50
Plow mold boards, 14 in	3.75
Plow mold boards, 16 in	4.00
Plow points, 1 horse	.40
Plow points, 2 horse	.60
Plow points, 3 horse	.75
Plow mold boards, patching, $ .75 to	1.00
Plow bolts	.05
Drill points	2.00
Drill points, putting on	1.00
Sharpening disc plows	1.50
Sharpening disc cultivator, per blade	.20

Wagon Repairs.

Wagon tires ⅝ by 1½	$8.00
Wagon tires ¾	9.00
Wagon skeins	5.00
Wagon gear brake	5.00
Resetting 60 cents each, per set	2.00
Wagon rims on felloes	6.00
Wagon rims, front wheel	1.40
Wagon rims, rear wheel	1.60
Wagon spokes, per set	7.50
Wagon spokes, front wheel only	1.75
Wagon spokes, rear wheel only	2.00
Wagon tongue, pole only	1.75
Wagon hound	.75
Wagon front gear hound	.75
Wagon back gear hound	.75
Wagon slides, top 25, bottom, $.75	1.00

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Wagon coupling pole	$ .85
Wagon axles, front $2.50, back	2.25
Wagon sandboard	1.50
Wagon bolsters	1.25
Wagon standard and irons	.75
Wagon standard old irons	.45
Cut down rims and tires	8.50
Cut down new ½-in. tires	6.00
Bed strap 35 cents, hook strap	.45
Wagon doubletree $.60, Wood and iron	1.00
Wagon singletree $.30, wood and iron	.75
Wagon neck yoke $.65, wood and iron	1.25
Wagon stay chains $.35 per pair, iron	.60
Wagon tongue caps	.35
Sharpening road grader	2.50
Sharpening cultivator shovels	.40
New rims, 1½-in	$5.50
New rims, 1¼-in	6.00
New spoke, $.25, 2 or more, each	.20
New reach	1.00
New pole	2.25
New circle	1.00
New shaft	1.50
New shaft C bar	.75
New singletree	.40
New doubletree	.75
New neck yoke	1.00
New body panel	2.50
New body end	1.50
New axle bed	1.50
New spring or headblock	.75
New side bar	1.25
New cart shaft	2.00

ordinary blacksmith. The builders or manufacturers of carriages can more easily systematize their work than those craftsmen engaged mostly in blacksmith repairing. The manufacturer can calculate to the fraction of a dollar the cost of producing a new vehicle. But such is not the case with the repair man, or the repair shop. The factory craftsman when he starts on his work is not disturbed for days or weeks. In the case of the repair smith he is bothered all day changing jobs. A separate organization or

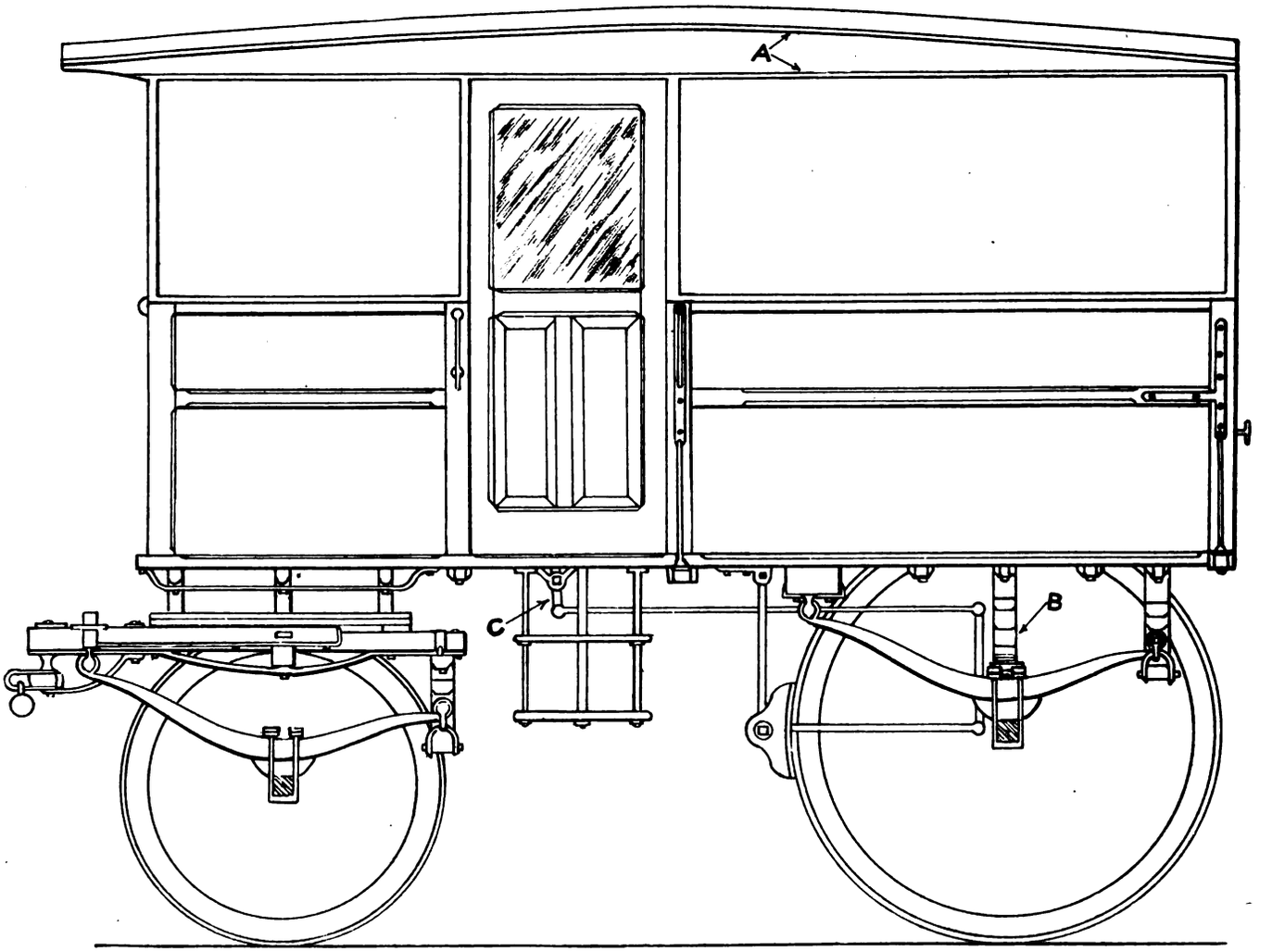


FIG. 1—SHOWING A SIDE VIEW OF THE MILK WAGON AS IT WILL APPEAR WHEN FINISHED

Sharpening cultivator B tongs, set	.20
Pointing cultivator shovels	1.50
New cultivator and shovels, no hitches	3.00
New cultivator, B tongs	1.00

Buggy Repairs.

Short arm axles, 1-in	$6.00
Short arm axles, 1¼-in	6.50
Short arm axles, 1½-in	7.00
Widening and narrowing	4.00
Widening and narrowing new beds	6.00
Resetting tires $.60 each, set	2.40
New tires, 1 in	5.00
New tires, 1½-in	5.50
New tires, 1¼-in	6.00
New rims, 1 in	5.00
Welding shaft iron	.40
Welding tees on pole	.40
Welding pole braces	.50
Bow socket	.75
Shaft socket	.75
Whip socket	.25
1-horse plow beam	1.25
2-horse plow beam, $1.50, 3-horse	1.75
Plow handle, 1-horse, $.40, 2-horse	.50
Plow rounds, each	.10

The Need of Organization in the Smith Craft.

JOHN WARNER.

The Cause.

The interests of the carriage builder differ materially from those of the system is essential for the repair shop. Many shops cannot afford to keep a special man for each branch or class of work, as ought really to be the case, and many of us can testify that a first or second-class all-around workman is a scarce article. It is contrary to natural laws that a man can be proficient in very many branches of mechanics. There are, of course, some few exceptions to the rule. Some men can do a good many things well, but we are not only looking for men who can do things well, but who can

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and will do them so well and so quickly that they are a profit to the business. Whose experiences have not been similar to those of the writer's in finding a man who could make a good plowshare, point and sharpen it well and spoil the first wheel that he tried to set a tire on? The writer has had good horseshoers, who claimed to be all-around workmen, who did not know the first principle of bending and welding iron. Every man has his strong and his weak points. If he is good on light work, the chances are against him on heavy work. Who has not observed that a wood-worker, who served his time on light work, is better at that than he is at heavy wagons? His proportions and finish won't be right, even though he makes good joints.

There always has to be a first shop in a locality. By this shop prices are established according to the conditions under which the proprietor is operating, coupled with his individual ideas. Some communities, owing to the class of customers and other conditions, demand a much higher grade of work than others. But for the purpose of illustrating the point at issue, we will take in a whole county, allowing that the conditions are reasonably similar all over it. One smith, who may have been at work for some other proprietor heretofore, starts in, and may not be familiar with prices—that part not being his business while at work for another. Say he has been receiving $3.00 per day for his services. He starts in for himself and takes in $6.00 the first day. He says "$6.00—50 cents for rent and $5.50 left—that beats working for

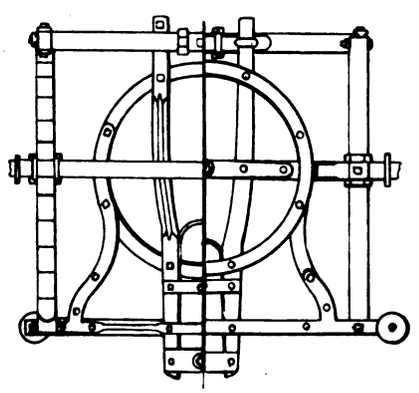


FIG. 5—SHOWING A BOTTOM VIEW OF THE FRONT GEAR

FIG. 4—SHOWING A TOP VIEW OF THE FRONT GEAR

others." This goes on well for awhile. Finally his available cash runs low and he says to himself, "I must collect some money for the work I have been doing." Well. the attempt results in collecting 25 or 50 per cent of his accounts. He has to wait for the other. Later he finds that from ten to 25 per cent of this money cannot be collected at all. This cuts him down about a dollar a day or to $4.50. Later on he finds his tire shrinker was not heavy enough for the work and another must be purchased. Innumerable other tools become worn out, and new ones must be ordered to take their places. These take money. When the year rolls round, our friend finds that between a few dull days, bad accounts, and damaged tools, he has not made $3.00 a day, and his money now is not ready for him Saturday night, and after making your own prices it is no easy thing to raise them.

Before taking up the examples of the other shops in competition, let us take for granted that the quality of work at all of the shops is the same.

(To be continued.)

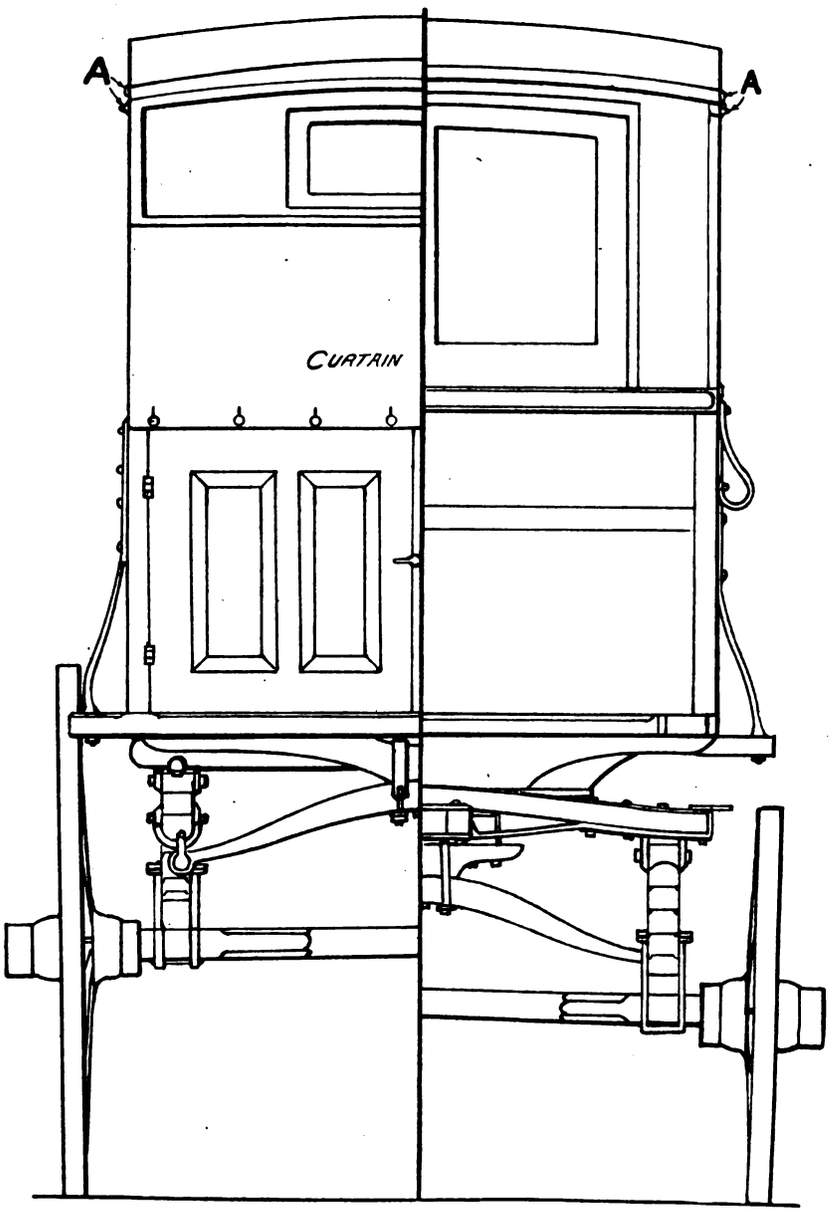


FIG. 3—SHOWING A REAR END VIEW OF THE MILK WAGON

FIG. 2—SHOWING A FRONT END VIEW OF THE MILK WAGON

Plans for Building a Milk Wagon.

NELS PETERSON.

A good idea of the general appearance of this vehicle when finished is shown in Figs. 1, 2, and 3. In order to thoroughly understand the detailed construction of the body, Figs. 7, 8, 9, and 10 should be closely studied. These will give some idea of how it is built, while Figs. 4, 5, and 6 show the construction of the running gear. This particular job is built somewhat larger than the ordinary retail milk wagons, being designed especially for use in the wholesale trade, where it is required to carry heavy loads, necessitating a proportionately heavier make-

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up of the various parts. The making of a body like the one shown in this drawing is no small task, especially where most of the work is laid out and made by hand, every piece cut out and fitted to its place without the aid of patterns or forms to go by. This is quite the reverse of the case in factories where a large number of the same style are built. It requires considerable experience for a workman to become a good body-maker.

The general dimensions; outside measurements of the body are 10 feet 4 inches long by 4 feet 4½ inches wide at the sills, and 5 feet high at the corners. The sills are 5 inches by 1½ inches. The corner pillars are 3 inches by 1⅝ inches, while those forming the door casing are 2½ inches by 1⅝ inches. The two pillars between the door and the rear corner are 1½ inches by 1⅝ inches. The rails running lengthwise are of various dimensions, as shown by the dimension figures. The lower part of the body being built with solid wood panels, the one extending from the sill to the first rail is ⅞ of an inch thick. Grooves are cut into the corner pillars and the pillars forming the door casing for the ends of the panels, while the top and bottom edges are fastened with wood screws to the sill and rail. The second panel is $\frac{7}{16}$ of an inch thick, and is grooved into the rails and the pillar all around to prevent any openings forming in case of shrinkage of the wood.

The upper portions of the body are made up of a framework as follows: The three rails as shown running from the corner pillar to the door are 3 inches wide by 1½ inches thick. A heavy canvas is stretched

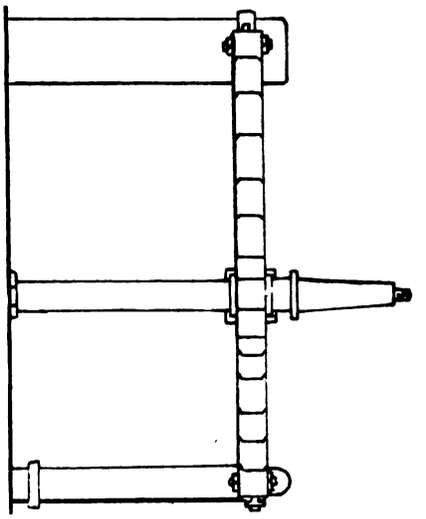


FIG 6—SHOWING HALF BOTTOM VIEW OF REAR GEAR

over these and finished off with molding over the edges. Referring to Fig. 10, which shows a half top view, it will be seen that ribs one inch thick are placed at intervals of 12 inches apart across the top. These support slats running lengthways as shown in Figs. 8 and 9. These slats are 3 inches wide by ½-inch thick in this case. Of course a man can use his own judgment as to size and material on hand. Over this framework is drawn very tightly a heavy canvas or tarpaulin cloth, which overlaps the corners, the edges being finished with moldings as shown at Figs. 1, 2, and 3.

The interior of the body is fitted up with box and partitions and a seat, as shown by dotted lines in Fig. 7. It will be noticed that the box for milk cans has a lid which can be opened by the driver from inside the wagon, and two doors at the rear end of the body provide access to the box from the outside. Above the doors is a canvas curtain fastened with knobs or buckles, to suit the builder's convenience, furnishing access to the shelf over the milk cans.

The running gear is of the full platform style, as shown, with a 30-inch circle; side springs 42 inches long; eight plates for front and back trucks, alike. An additional spring, known as a helper spring, is also placed over the rear axle, as shown at B, Fig. 1, the ends resting on an iron block fastened over the side springs. The axles are 1¼ by 7-inch spindles in front and 2 by 7½-inch spindles for the rear. The wheels are 36 and 48 inches high, with 1¾ and 2-inch thread. The brake attachments are similar to the one shown in the January number, except that the foot lever passes through the bottom of the body as shown at C Fig. 1.

Selecting the Proper Machine or Appliance for the Work.

J. W. ALBERT.

When studying the proposed equipping of a small shop or a large plant, consider well the situation in your shop and what the machines must do, before finally deciding on any style, class or design of machine or tool. When absolutely certain that a particular machine will do your

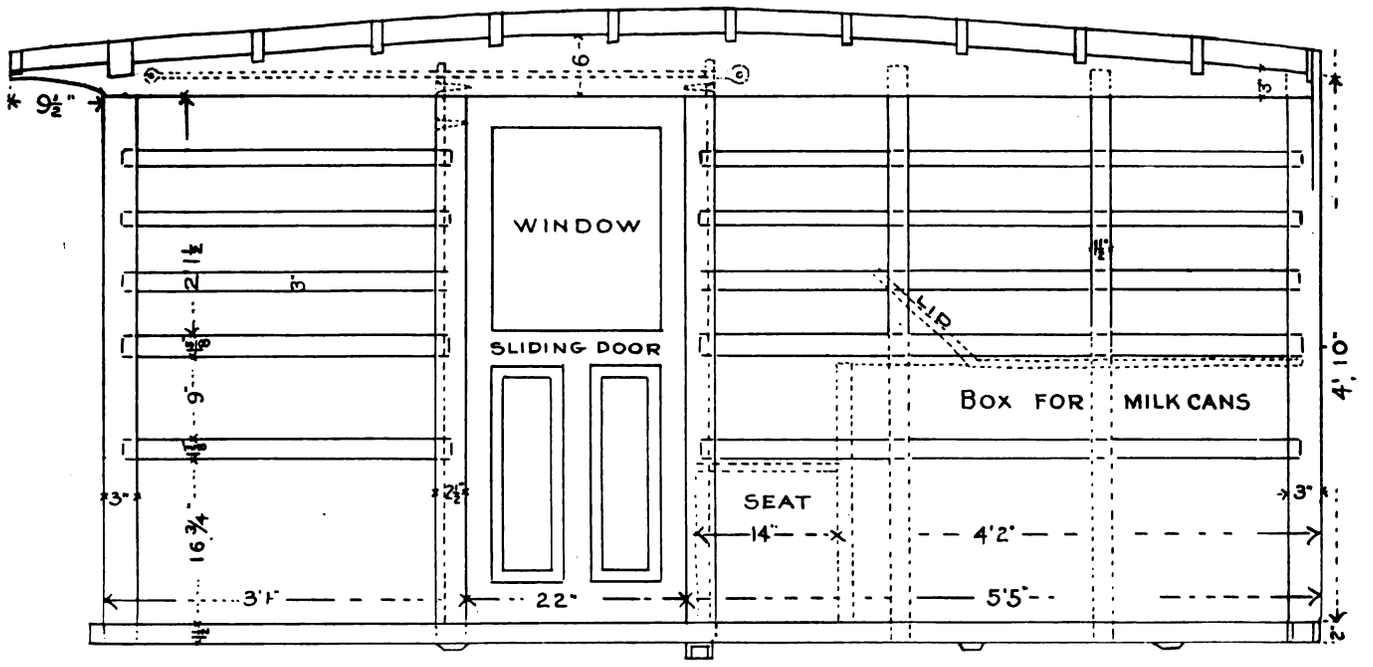


FIG. 7—SHOWING DIMENSIONS AND CONSTRUCTION OF THE BODY OF THE MILK WAGON

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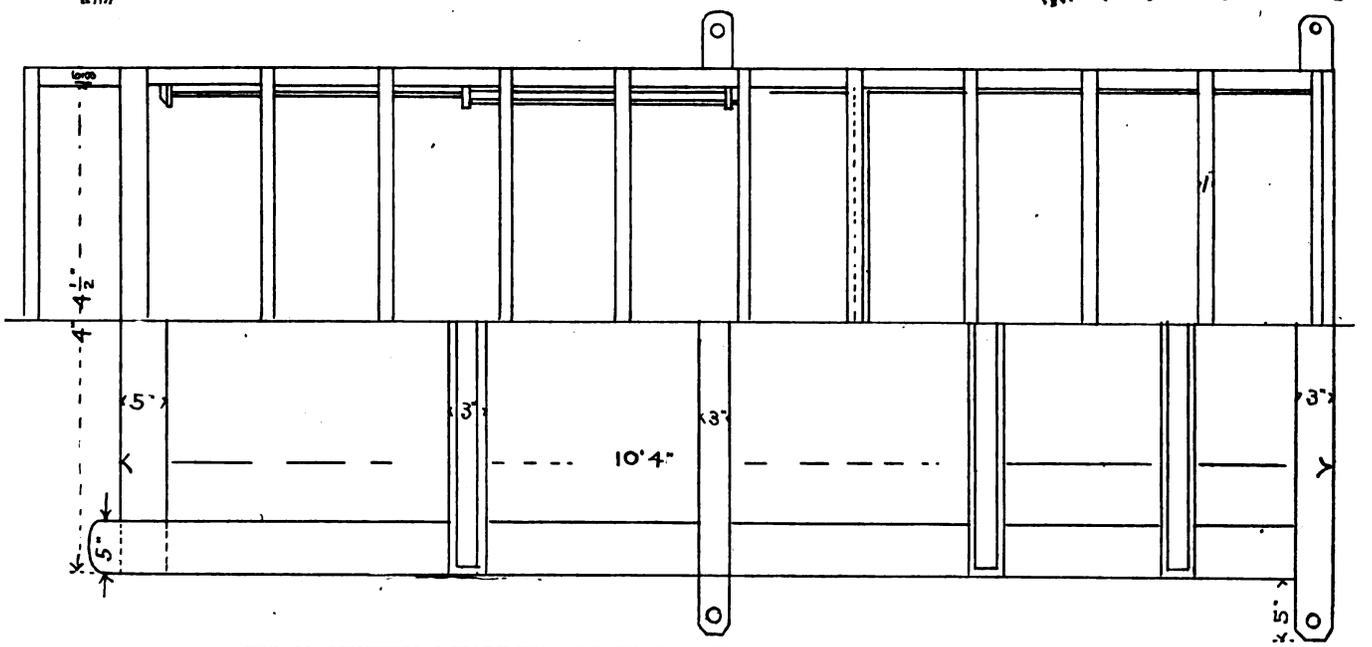


FIG. 10—SHOWING A HALF TOP AND HALF BOTTOM PLAN OF THE MILK WAGON BODY

work as you want it done, then, and not before, order your machine.

This apropos of a recent conversation with a printing plant foreman. The establishment of which my friend is foreman is perhaps one of the largest and most modernly equipped printing houses in the country. Its presses are of the most approved design, its equipment of latest type, and everything of the most modern style. "Our presses are all direct connected to individual motors by means of noiseless steel chains." continued the foreman. "How do you like the chains?" was asked. "Well, I'm beginning to think that they're not just the thing for printing presses," continued the printer. "This method of driving machines is undoubtedly excellent for lathes, planers, and the like, but the very fact that there is no slip or slide to the drive disqualifies it for printing presses. A press should not be started in this way. For best work a press should start gradually, and come up to its speed at easy stages." This foreman printer also said that this style of drive was to be superseded by leather belts simply because a belt slipped.

This incident is noted just to show that because a certain machine, tool or appliance is the most up-to-date is no reason why it is best for your particular needs. Of course, 'tis not always possible to test a proposed equipment under the exact conditions as found in your particular shop, but with due allowance for individual conditions, and the consideration of all sides of the operation problem in your shop, the purchaser will not go far astray in selecting his equipment. And the manufacturer who recommends his machines, tools or appliances for work which he is not absolutely sure they can perform with satisfaction, is indeed short sighted. This practice is sure to react unfavorably on the machines in question, and will give rise to unjust and unfavorable criticism. For instance, the writer knows of cases where the chain drive referred to in the above conversation is found an excellent means of power transmission, yet in this particular case it is not what was wanted, and for this reason is likely to reflect most unfavorably upon the merits of this particular style of drive.

The need of goinginto every possible phase of the equipment problem is of paramount importance to the future of the plant or shop. It may mean the saving of many dollars where careless or passing attention would mean the

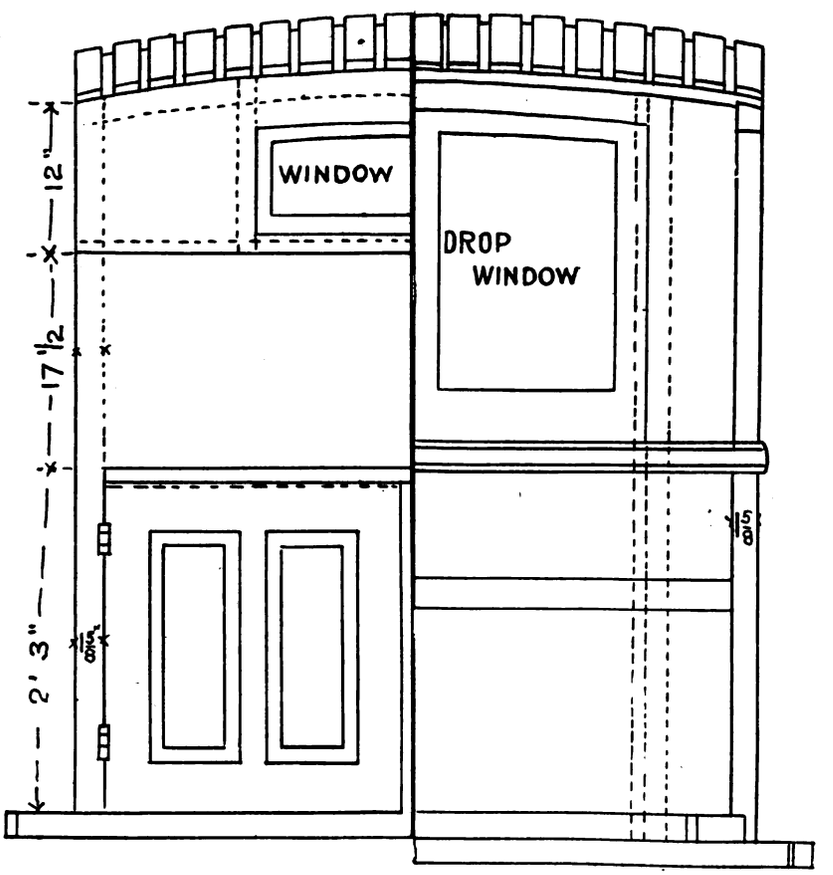
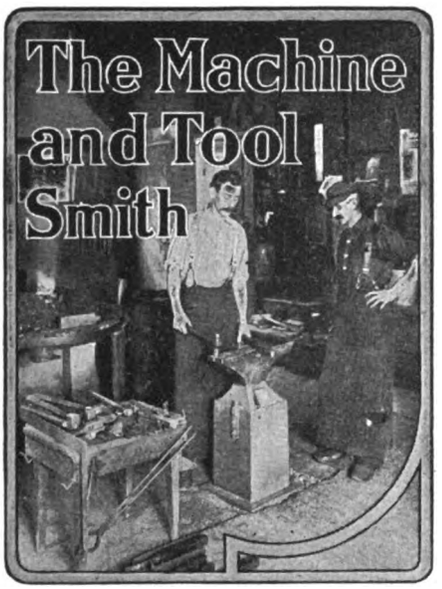


FIG. 9—SHOWING CONSTRUCTION OF REAR END OF MILK WAGON BODY

FIG. 8—SHOWING CONSTRUCTION OF FRONT END OF MILK WAGON BODY

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probable replacing of part of the equipment with other machines which will be more suitable in many ways.



Proper baths for the proper steel are important in steel working. No one bath will do for any kind of steel, nor for every kind of work. Nor will a certain kind of bath do for a certain kind of work, no matter what steel is used. Everything about the metal and the work must be considered. And 'tis poor policy to guess at anything about steel manipulation. Know, and know it's right, before you go ahead. O. M. DAY.

The location of the steel-heating forge—ever think it important? As a rule it is placed anywhere about the shop—usually in some unused, out-of-the-way corner. The location should be selected with care—not too much light. The direct rays of the sun should never reach the operator at the steel-heating forge. Good and uniform results with steel can only be had with a properly located forge for heating. D. A. COWAN.

The Making of Frogs and Crossings.

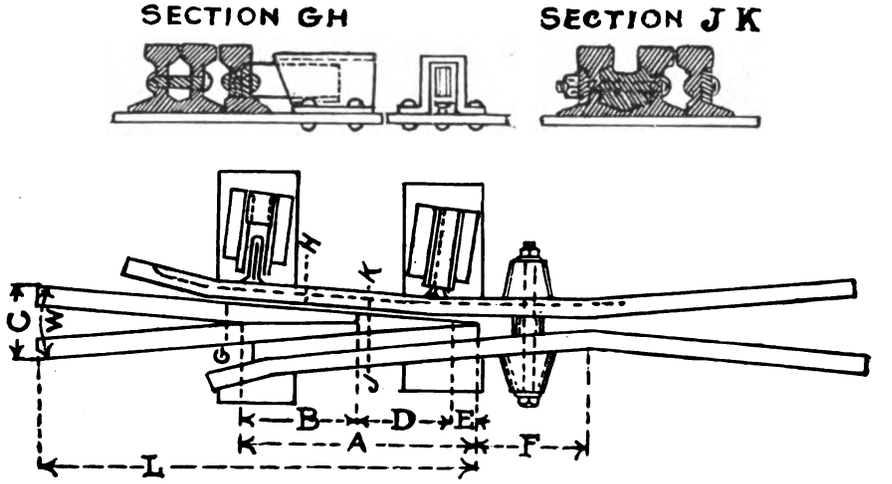
S. UREN.

The method of producing frogs in the Southern Pacific shops is very simple, for all standard frogs templets are used. Frogs for different angles are continually being ordered, and templets are not used, as it would take as much time to make the templets as to put the proper bends in the rail to produce the frog. The old method of cutting and fitting the frog points in the blacksmith shop is discontinued, as much cheaper and better joints can be made by cutting and fitting the parts together by the improved machinery now in use in the machine shop, such as slotters and planers. In many cases the frogs are ordered by numbers 5, 6, 7, 8, 9, 10, etc. When the number is given, to ascertain the angle divide five by the number. The quotient will be the size of half the angle, the nearest corresponding number in the trigonomical tables will give half the angle and multiplied by two, will produce the angle required. When the angle is given to ascertain the number, divide the cord of the frog point by any given length, and the product will be the number required.

The formula as shown for Fig. 1 is used to determine the bending parts of rail, and the lengths of the finished surface to form the point. The short member of the frog point is bent out at the junction of the two rails for the purpose of leaving, after being planed, the web of the rail in its original shape. The long point rail is bent at the intersection of the two members, for the same purpose. The long point rail is usually intersected where the angle of the point increases to the full thickness of the rail head.

Much improvement has been made in railroad crossings since 1897, not only in the construction, but in the durability in service and convenience in manufacturing. Since the 80, 90, and 100-pound rails have come into use it is impractical to make welded corners from the steel-rail section now in use. The crossing as shown in Fig. 2 is between the angles of 27 and 50. From my standpoint it is the simplest and easiest constructed crossing that has come to my notice. It consists of three main-line rails, N, O, P: N is termed the easier rail; O the traffic rail and P the guard rail. Flange ways are cut out at the proper angle. The nine pieces of rail that intersect the three main lines are sawed to the proper length and angle with a power saw, operated with an electric motor. The different members are assembled and clamped. Filling blocks are closely fitted to the contour of the rail section at the crossing points as shown at section RR. The acute angle and obtuse angle irons, and filling blocks and bending the ends of guard rails is about all the blacksmith has to do with this class of crossing. The machinist does the balance. It will be noticed that the easier rail extends 12 inches past the traffic rail, for the purpose of connecting the main-line rails to the crossing.

Crossings between the angles of 50 and 90 are similar to the above described, excepting that the bolt fastenings are at S S only. Crossings between the angles of 27 and 60 are made by usual method of end and side frogs, the long distance between the side and end frogs being filled in with distance pieces of the proper



ANGLE AND LENGTH OF POINT GIVEN.

$A = \text{COSECANT } \frac{W}{2} \times \text{THICKNESS OF RAIL}$

$B = \frac{A}{2}$

$C = 2 \text{ SINE } \frac{W}{2} \times L$

$D = B - E$

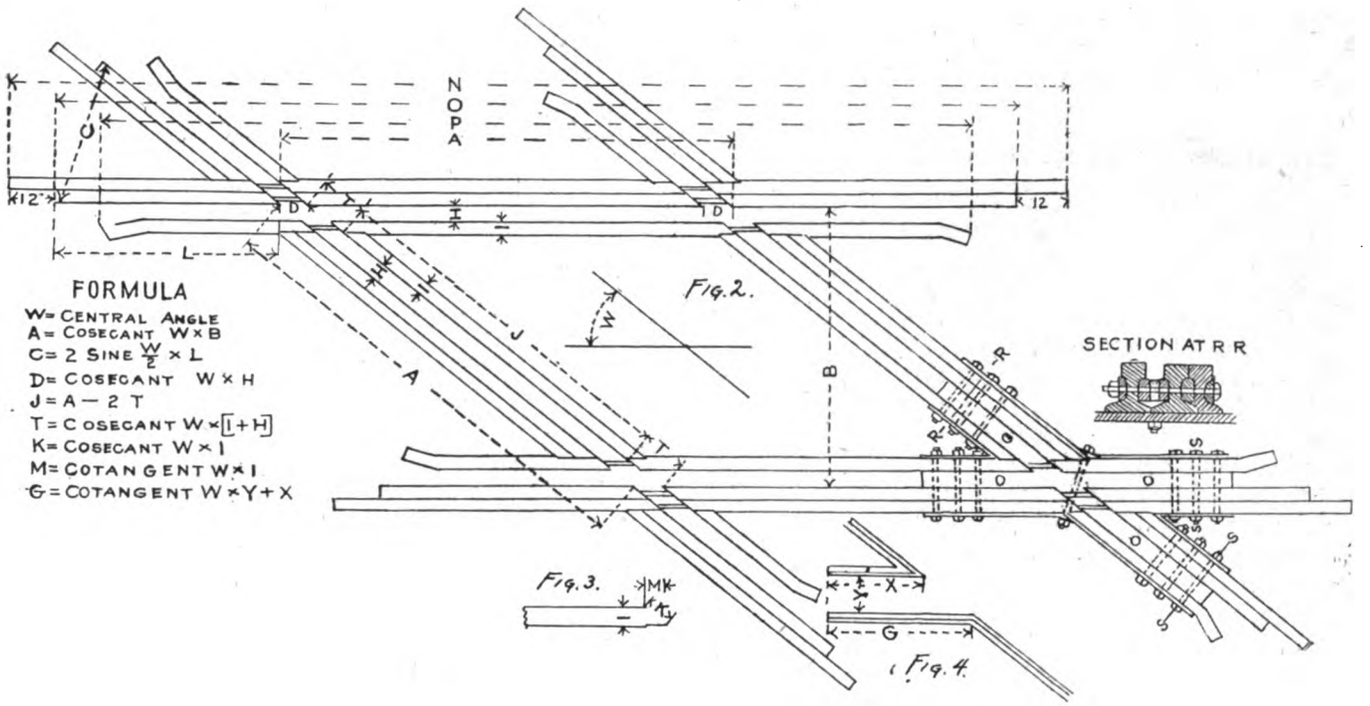
$E = \text{COSECANT } \frac{W}{2} \div 4$

$F = \text{COSECANT } W \times \text{WIDTH OF OPENING}$

$\text{SINE } \frac{W}{2} = \frac{C}{2} \div L$

FIG. 1—SHOWING FORMULA TO DETERMINE BENDING PARTS OF RAIL IN FROGS

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FIGS. 2, 3, AND 4—SHOWING FORMULA AND METHOD OF MEASURING AND MAKING CROSSINGS

length. When the two tracks are tangent the center angle should be given. All the lengths are easily ascertained by the formula as shown in Fig. 2. If it is a curved crossing, and the two curves are flowing in the same direction, all of the lengths between crossing points can be ascertained, the same as a tangent crossing. This is not absolutely correct but practically so, as the difference between the arc and the cord of the arc in the length of a crossing is almost infinite, and the inside and outside radius in the crossing would not vary materially in the length of a usual railroad curve in the length of a crossing. When the crossing consists of a tangent and curve track, the lengths and angles vary considerably from the center angle, and it is a difficult mathematical problem to solve. My practice is to lay such crossing out one-eighth size on a convenient table, and place the measurements on a sketch, and saw all the members to the proper length and angle, as in a tangent crossing. By consulting the trigonometrical tables, which can be found in almost any mechanical pocket book, all of the members of frogs and crossings can be readily ascertained, cut to the proper lengths and angles. From the writer's point of view this method is much easier and more practical than the old method of laying out the crossings on the floor or large table.

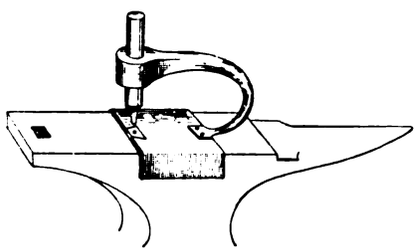
Fig. 2 represents a crossing between the angles 27 and 50, and Fig. 3 the method of laying out the different members to be sawed. A protractor set at the proper angle is a convenient instrument for marking the ends of the different members to be cut. Fig. 4, the acute angle piece, must be made of sufficient length to receive the bolts. The length of the obtuse angle piece is determined by multiplying the cotangent of W by Y, plus X, which equals G.

In all shops the repairing of old frogs is quite a factor. The method adopted is to use and interchange the good material from one frog to another.

An Anvil Punch for Cold Steel and Iron.

E. A. BUZZELL.

This is a very useful and helpful tool of my own design, for punching cold steel and iron. I took a piece of iron from an old mowing machine, four inches wide, and ⅝-inch thick having it long enough to bend over



A SIMPLE PUNCH FOR ANVIL USE

each side of the anvil about two inches. While hot I dovetailed a slot in its side at center, for a die. Then I punched two holes at the opposite side of the plate, to rivet on the punch-guide. I then took a piece of 2-inch shoe steel and heated it, and in its end I punched or drilled two holes to correspond with the two in the plate. I then reheated the steel and put it in my vise, and took a one-quarter turn on the punched end, so it would lie plumb on the plate. I made a punch out of good tool steel ¾-inch round, and hardened both ends. I now turned the punch-eye in the end of the punch-guide, to fit the punch and have the punch-guide long enough so that the punch will come direct over the center of the slot for the die.

Now to make the die—take a horse rasp, and cut a section partly off, nearly large enough to fit the die slot, having it hot all the time (reheating as necessary). Then fold about three times, or enough so when the sections are welded together flatwise and hammered down they will form a plate thicker than the bed plate itself, or thick enough so that the work to be punched will rest on the die and not on the bed plate. After the die is fitted in the slot remove to the fire, and heat it red hot, then return to the slot. Put punch in the guide, and mark for hole in the die. Then remove die again, and with another punch punch a hole entirely through the die, and make the hole larger on the under side, so the core of the work will drop through. Now harden the face of the die, but not

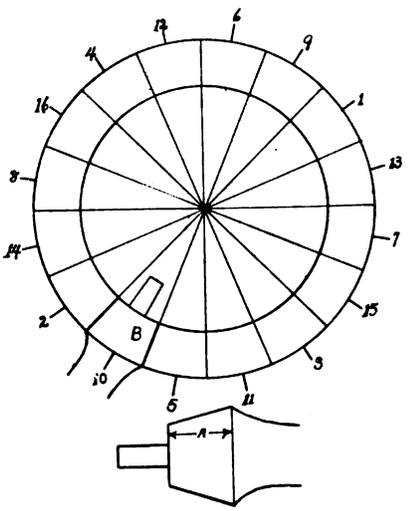
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all the way through. You can make dies and punches up to ½ inch. These will punch ¼-inch cold steel stock. I use a 12-pound sledge for punching.

How to Fit Spokes for Sarven Hubs.

W. A. SHORT.

Cut all the rivets, then take out all the old spokes. After this is done straighten up the flanges in good shape, before driving any spokes. If there are any old spokes that can be used as a pattern I take one and fit all the spokes just like it. If I cannot get an old spoke, then I make a pattern thus: Draw a circle the same size as the hub where the shoulder of the spokes rests. Then measure your spoke from the shoulder to the widest part of the spoke as shown at A. Now supposing you have laid out a 3-inch circle, draw another circle outside of the first one, and as much larger as the length of A. Now divide the circle into 16 equal parts, and make your pattern the exact size as shown at B. This gives the face of spoke. Now make each spoke the exact size and shape of this pattern, and make the face of the spoke straight. Slope the back of the spoke about $\frac{1}{16}$ of an inch from shoulder to point. I use a spoke large enough to fill the flange full. After all the spokes have been fitted I then drive them as per numbers in the diagram; number two opposite number one and so on until eight are in. Then I fill each vacant place exactly, and am very careful not to let one spoke force another out or sideways. I use hot glue in driving, and after the spokes have all been driven in, I put a bolt through the hub from end to end, and tighten up the bolt with a large wrench, which brings the flanges up tight on the spokes, if they have been forced apart in the least. I now drive each spoke again, and then bore for the rivets. Use a $\frac{5}{16}$-inch bit for a $\frac{7}{32}$-inch rivet, and so on so that the rivet will be tight in the hole, and not bend in riveting. Cut the rivets ¼-inch longer than distance through hub, and use a rivet set to make a nice job. Now put on the rim and set the tire. Yes, brothers, I am one of the rivet-cutting gang.



THE ENDS OF SPOKES MUST FIT HUB EXACTLY

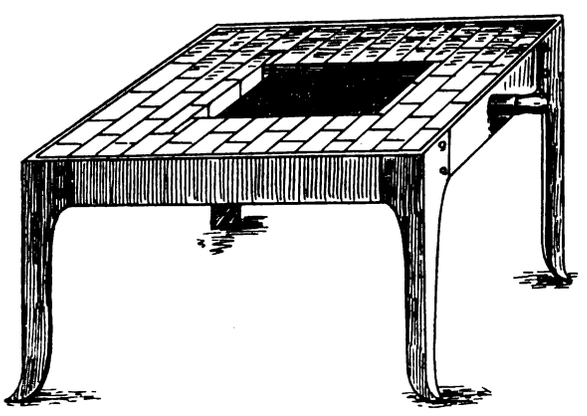
Welding Wide Tires.

J. C. LAMON.

I will endeavor to give a practical method for welding wide tires or any other wide stock that comes to the smith shop. First thing necessary and most important is a properly constructed forge, sufficient blast, and good coal. I will describe a forge that is easily constructed by any smith with the material usually at hand, that will be suitable for that class of work. Take a piece of 3-inch black pipe, five feet long, and, beginning in the center of the pipe, drill ten ⅝-inch holes, 1½-inches apart. This is bedded in the forge five inches below the top; the forge is made four by four feet by two feet six inches high.

Referring to the engraving the reader will better understand the construction of the firepot and tuyère. The firepot should be made of firebrick. The bricks are laid in such a manner as to form a "ducknest," a form of construction familiar with most smiths. For tires and bands 12 inches wide, the firepot should be eight by 16 by five inches deep, and connections made with the blower. A plug is fitted to one end of pipe so that when necessary the pipe can be cleaned by removing the plug and turning on blast which removes all clinkers from the blast pipe. It will readily be seen that to weld wide stock it is necessary to have a "heat" sufficient to cover the area of material to be welded. It is necessary to have a heavy blast, as the openings in the blast pipe equal 6¼ inches, and on heavy tires it requires a large volume of air.

On this forge the smith can weld tires 12 inches wide at one heat, by having three helpers. With long blast pipe and large firepot you can make a wide or narrow fire. It can readily be changed for other classes of work by filling up the space in the firepot with bricks to as small an opening as is desired.

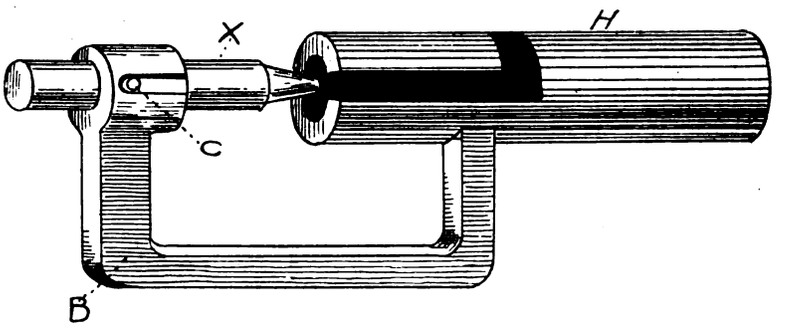


A SIMPLE FORGE FOR HEATING WIDE STOCK

A Handy Bow Rivet Punch.

E. S. CUNNINGHAM.

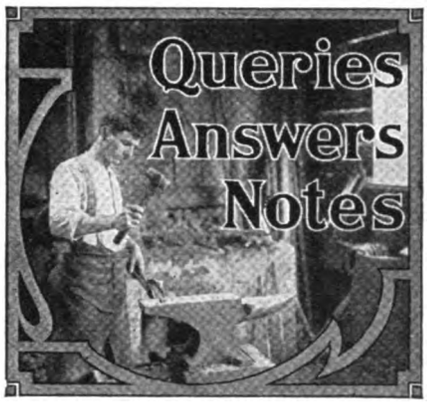
The old method of punching bow rivets is out of date. The practice of having one man hold a piece of iron with a hole in it against the rivet head, a sledge against the iron, and then another man to punch out the rivet, is too expensive of time to warrant following nowadays. Quite often it results in a broken bow, which costs the price of several rivets. But since we've been using the device here pictured we haven't broken a single bow.



A RIVET PUNCH FOR USE ON BUGGY BOWS

To make this punch, take a piece of 1½-inch round iron or steel 12 inches long and bore a hole through the center of it for a distance of about two inches from one end. Now bore a hole in the side of the piece connecting with the hole in the center. A slot is now cut following the direction of these holes as per the engraving.

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The following columns are intended for the convenience of all readers for discussions upon blacksmithing, horseshoeing, carriage building and allied topics. Questions, answers and comments are solicited and are always acceptable. Names omitted and addresses supplied upon request.

Has Contracted Fore Feet.—I have a mare that is contracted in front. Her feet are very sore at the frog, and the hoof is very hard. I have tried to spread the foot, but have failed so far. Will someone kindly tell me what to do in this case? BRENTON MCCLELLAN.

Likes it Very Much.—I like THE AMERICAN BLACKSMITH very much. I get more information out of it than I do working in a shop where there are 21 smiths at work every day and where most every day a new man or two comes in to work. T. J. TRANKLE.

About a Power Hammer.—In answer to C. W. D.'s question in the March issue I have just installed a Modern Power Hammer, I have used several power hammers, but this is the best one for a small general blacksmith shop. The body of the hammer is never in your way. JOHN WINDISHAR.

A Question on Cornplanter Shoes.—I wish some brother blacksmith who has had experience would describe the process of laying cornplanter shoes in the next issue of THE AMERICAN BLACKSMITH. I have never laid any, and have never seen any that had been. W. H. HOFFMAN.

The Length of Axles.—I would like to ask through your valuable journal for the right and proper rule for getting the right length of axles, either for narrow or wide track wagons, either long or short spindles. I have a rule, but would like to hear from some brother on this subject. A. DUBECKER.

Wants an Auto Chain.—Will some brother kindly tell me what size chain I will need to drive a spring wagon? The wheels are about 50 inches high, sprockets about 20 and 24 inches, the engine is a 16-18 H. P. and I want to make a speed of 15 or 20 miles an hour. Also, where can I get such chain and sprockets? Can some reader tell? D. C. STARTA.

Clicking and Gas Engines.—I would like to ask a few questions through the columns of THE AMERICAN BLACKSMITH. The first one is: how can I stop a horse from clicking? The second is: What make of gasoline engines is best for blacksmiths. I intend to buy an engine soon, and would like this information. I hope that some brother blacksmith can favor me at an early date. E. S. FISH.

An Improvement on the Old Device.—I can add an improvement to the blacksmith's device for holding long work, which appeared in your November issue, page 42. Instead of using iron or other solid weight for a counterweight, use a tin can filled with water. The weight can then be adjusted very carefully and accurately for different weights and sizes of iron. G. FOSTER HOWELL.

He Expresses Appreciation.—I wish to thank Mr. C. W. Metcalf through the columns of THE AMERICAN BLACKSMITH for the device which he described in the December number. This contrivance is for vicious horses. I tried it today and it works like a charm. It subdued the horse in less than two minutes. He was as quiet as a kitten. We had a patent device for taming horses, but this was broken very easily. C. R. SALISBURY.

On the Cutting of Keyways.—Brother H. L. L. talks of cutting keyways. His methods are all right, except the last. A narrow cold chisel is a poor tool to do that kind of work. In my practice, I take a half-round chisel or not quite half-round, made according to size of keyway, and it cuts out very fast. I then finish up with a cape chisel and a file. A narrow cold chisel will work the same as the cape chisel. R. L. HENRY.

He'll Read it as Long as He Lives.—I read THE AMERICAN BLACKSMITH, and don't see how some blacksmiths can do without it. I will not read daily papers any more, I have thrown them away. I am more satisfied with THE AMERICAN BLACKSMITH than any other paper in the world. There is more interesting matter in it, and it is a great help to me in my work and shop. And I won't be without THE AMERICAN BLACKSMITH as long as I live in this world. TOBIE J. VOGT.

A Power Shop of Nebraska.—Since I have been reading THE AMERICAN BLACKSMITH, I have put in a five-horsepower gasoline engine and a perfect power hammer, a power drill and a power blower. My shop is 20 by 50 feet. I do all kinds of repairing and also build new work. I breed trotting horses for a sideline. By reading THE AMERICAN BLACKSMITH I get higher prices for my work than my brother smiths do and on the first of March, I am going to make a raise of 25 per cent on all job work. JOHN G. ROBINSON.

A Massachusetts Shoeing Shop.—I make a specialty of horseshoeing, and the treatment of horse's feet. Our prices are as follows:

Common shoes, 1 to 4	$1.50
Common shoes, 5 to 7	1.80
Bar shoes, pair	2.00
Leathers, pair	.50
Rubber pads No. 1 to 3, pair	2.00
Rubber pads No. 4 to 6, pair	2.75

I enjoy reading THE AMERICAN BLACKSMITH very much, and think every up-to-date shoer should subscribe for it. J. P. MCCARTHY.

How to Weld Wide, Heavy Tires.—My method is to scarf both ends of the tire, draw the scarf down to an eighth of an inch, and then cut the corners off as at A with your chisel, instead of stoving the corners in. For flux on heavy tires insert white clay and salt: one handful of salt to three of clay, and one handful of pulverized red sandstone. Don't apply until you have a good heat started, and then apply and turn very slowly and bring your heat up easy. I use a six-pound hammer, and strike right over the bottom lap. Don't pound the tire edgeways. J. H. BARTHOLOMEW.

How to Weld Wide Tires.—I will give my way of welding wide rings and bands, which will do as good on tires, I think. In the first place have a clean fire, and a wall of wet green coal on bottom side of your tire. Now place tire in the fire, and cover the lap with a fire brick, letting it come over each edge about one inch. Cover this with good coke, heat slow, scarf and place in fire again the same way, and heat slowly and weld. I use borax on all of my rings which are from 3½ to 5½ inches wide and ½ to ⅝-inch thick, Bessemer steel, and O. H. I have welded about 150 in the last year, and haven't burnt one, or heard of one breaking at the weld, and they are all machine finished to ⅜-inch thick. W. D. N.

Welding Wide Tires.—I noticed in the last number that there was a brother smith that wanted to know of the best way to weld wide wagon tires. There are different ways; one is to scarf the ends, be sure there is no dirt between laps, and, with a good welding compound, a good clean fire, heat slowly till nearly welding heat, then throw a little sand or borax on the tire. If you have got the proper heat, you are sure of a good weld. Another way is to fit your tire same as before, and use a piece of Laffitte welding plate. The plate should be somewhat larger than the tire, of course, and it must be put between laps. Use the heavy plate and you will have an easy and good job of it. J. M. GAZA.

A Talk on Cold Chisels.—One brother has trouble tempering cold chisels. Perhaps he has a piece of steel that has been overheated in the making; in that case there is no good remedy. Maybe he gave it too high a heat or hammered it too cold. Now I make a good many drills for mining and to cut hard flint rock, and I have good luck. I heat very carefully to low cherry, and just as little on end of tool as possible. Draw very slowly in common water and stop temper at light blue for cold chisels, as dark red is going out on drills for hard rock, and deep blue for soft rock. I have no trouble tempering. You will find it to be a fine art and hard to understand, and much hard study is necessary to reach perfection. I have been at it for 60 years and I learn



HOW TO WELD HEAVY TIRES

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every day. There are so many grades of steel to contend with. A. S. PRIMMER.

An Interesting Letter from Canada.—I have been running a general repair shop for four years, and have been very successful so far, and I never say no to any job. I will give a list of my machinery. I have a two horse-power Gieser gasoline engine, and it does fine work. I have a 36-inch band saw that I do all of my sawing on, such as wagon felloes, hounds, etc. I have two turning lathes, one for wood and one for iron. I have a small circular saw, which I do my ripping on.

I see lots in THE AMERICAN BLACKSMITH in regard to the cold-tire setters. I have one, the Brooks make, and I want to say they are all right, but you must understand working them. I have never had anyone complain of the work I done for them. I have a hot shrinker, a drill press, a bulldog wood vise, and all the other small tools which are needed for the business. I have a set of screw plates, Invincible make, and pipe dies to cut pipe from ¼ to 2 inch. I am in a mountain section where there is lots of wagoning and plenty of mule shoeing. I have one assistant and we two are pretty busy most of the time. W. B. LITTLE.

A Letter from Quebec.—My shop is 20 by 44 feet, and is wood work only. It is equipped with a rip saw, one jointer, one planer, one cross cut saw, one spoke tenoner, one drill, one iron lathe, one wood lathe, one emery stand with two wheels, and one 20-inch band saw. All these machines are driven with a four-horse-power Lair oil engine.

I want to ask readers running machines for felloe rounding, what is the best machine to do this work on, bent or sectioned felloes. I now do this work by hand, but it is too slow and not accurate. My machinery is all home-made, except the iron lathe and engine. I entered this business with my father, and as we had no money with which to buy the best tools, I made these machines. They have now been running continuously for five years with service, and I expect to make other labor-savers.

As a side line, my father has 25 beehives to handle in summer, and in winter he saws cord wood and poles, and builds circular saws. We, therefore, make money in the dull season, too, and the side lines attract customers to the shop, and is good advertising. L. P. L.

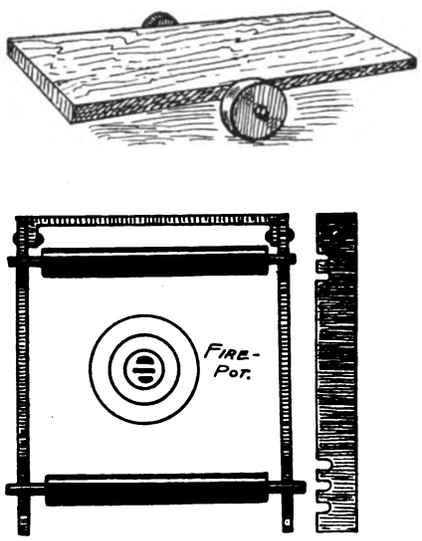
A Letter from West Virginia.—I have done all kinds of work during my 61 years on earth. I think smithing a good calling for anyone, but the public in a great measure do not appreciate a good blacksmith. They try to get all their work done on a cheap scale. It does not make any difference who does the work, as long as they can save a few pennies. We have a great many "botches" here who cut prices and work for half what the learned mechanic will. They have so many unskilled workmen, and employ anybody that can tack on horseshoes. I hope our Legislature will pass or make such laws that the craftsmen will have to pass a rigid examination before they can shoe horses. I have always kept my prices in all work, have never cut them, and always have had good business. My prices for shoeing are:

Plain	$1.00
With toes	1.25
Setting axles	1.00
Welding buggy springs	.50
Sharp mattocks	.25

My other prices are about the same as the above. C. C. MARSHALL.

Two Tire Helps.—I find some smiths have their tire crimper too far away from the anvil for convenience. I have a small truck made of a 5-foot plank fitted with two 10-inch wheels. When wanted it is rolled up to the anvil, and one end of the plank placed in a mortice in the anvil block. This holds it solidly. When not needed this little helper can be pushed into a corner and out of the way. My machine is a large Stodard.

I also have a pair of iron rollers, one on each side of my fire to handle tires on.



TWO EASILY MADE TIRE HELPS

The frame is made of 1½-inch old wagon tire, and is built around three sides of the fire. Mine is 23 inches long, by 13 inches wide. The frame may be left on the forge. When ready to heat a tire, put the rollers in place and proceed with your heating. The side view at X of a piece of the frame shows how the rollers are held in place. By using this device you can always heat a large tire very easily. Try it brother. It will pay any smith to stop and make one. I have used one 23 years and it is good yet. E. D. PENDLETON

A Few York State Prices.—I have been doing so much business lately that I hardly find time to order goods. I am located in a fine country for smith work. Will send you a short list of my prices:

New shoes 1 to 5	$ .25
No. 5	.30
No. 6	.35
Bar shoes, per pair 1 to 5	1.00
No. 5	1.25
No. 6	1.50
Toeing	.15
Calking shoes from 1 to 5	.35
No. 5	.40
No. 6	.45
Hand-turned shoes, per pr...from	$ .75 up
New light tires, per set	4.00
Setting light tires, per set	1.60
Heavy tires up to 2½ inches	2.00

Heavier tires come under truck tires, and I get more, according to the size. For repair work our prices are better than the average country shops. I do good work, and charge for it, and there are very few kickers. I think the time is soon coming when the craft will demand and get better money for their work, and we certainly need it, for horseshoeing especially is work that makes men old before their time. J. D. BAYLOR.

A Good Price List from Washington.—I am a reader of THE AMERICAN BLACKSMITH, and am very much interested in it. I get plenty of information from it in regard to my business, and enjoy reading it. I am glad to see so many of the brother smiths giving their prices on their work, but don't think the majority are getting enough. I will give you some of our western prices, which we think are too low.

Shoeing, Neverslip, per span	$7.00 to $7.50
Common shoes, per span	$4.00 to 4.50
Resetting, per span	2.00
Plow lays	$4.00 to 4.50
Points	1.00
Sharpening	.35
Setting buggy tires, per set	4.00
Wagon tires 1¾ tread	3.50
Truck	4.00
Wagon tongues	4.00
Tongue	3.00
Axles	5.00
Bolsters	3.50
Cutting down wagon	14.00
New buggy pole complete	7.50
Wagon and buggy spokes, each	.40
Felloes	.50

Our other prices are in proportion to the above, which are somewhat better than the majority. E. M. DUNN.

A Florida Letter and Price List.—I look forward to the coming of THE AMERICAN BLACKSMITH as I do to the material to go in my shop. I find it a great help. I have only been in the blacksmith business a little over two years, but feel that I have learned a good deal. But there is lots that I don't know yet. One of the principle things is how to do stripping. I have not seen anything on this subject yet—that is how to mix stripping paint, and what kind of brushes to use. I notice a good deal of variations in price for blacksmith work, will give a few of mine.

Shoeing per set of 4 plain	$1.50
Fill 3-inch wheel rims and spokes	3.50
Fill 2-inch wheel rims and spokes	2.75
Shrinking 2-inch tires and under	.50
Shrinking buggy tires	.75
Shrinking 3-inch tires	.75
Wagon shafts complete with single tree	3.75

Other prices are in proportion. I have seen several hints on filling Sarven wheels. I believe there is only one way of doing it substantially by hand viz.: remove every other rivet. Then notch out eight spokes for the remaining rivets. Don't split off the notch to the end. Drive them around the rivets. Then drive the other half without notching, using good glue. Then bore and put in the four rivets. J. D. ENNIS.

A Little Talk on Shoeing.—I have read with interest many ideas from different men on horseshoeing, how to treat different cases of faulty action, interfering, split toe, quarter cracks, forging, etc. But I notice men are like horses, do not all go alike. Yet it helps a smith to get

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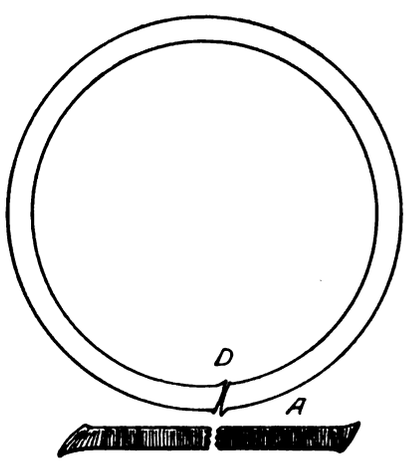
different ideas and sort out what is worth retaining and let the rest go.

I am 50 years old and have stood up against horses since I was 16 years old. For me to tell you that I ever made a horse would be foolish, for you would not believe me. But I will say this, that after several horses had been given up by other smiths and practicing veterinarians and ordered to be shot, through the advice of friends they have brought the animals to me, and the result was they did not have to take the dose of lead, but were made all right.

I find there is no one rule to be given for shoeing all horses. Some animals want heels lowered, others toes, some inside, some outside, some long toe, some short. And so it goes, nearly as many different horses as there are different ways of shoeing them. So after all a person reads, when he picks up the horse's foot, he wants to know at a glance just where to cut, or else he will be like the boy who fell out of the balloon, he won't be in it. N. A. CUMMINGS.

Welding Iron Tires.—I see, in the March number, W. S. Groves wants to know how to weld iron tires. I will tell him how I weld them. First upset the ends well, as shown at D, and punch hole for pin, and then put some welding compound between the laps and pin together. Now put in fire, heat, and hammer lap together snugly. Then clean fire out nicely and put your tire in and put on borax. Don't hurry your fire at first. Use lots of sand on bottom and edges of tire, and don't be afraid of heating too hot. I have had 25 years' experience with them and have little trouble with welding them this way. If they are new tires, cut the right length, upset and scarf before bending, as shown at A. E. A. BUZZELL.

A Letter from Arkansas.—I have been reading THE AMERICAN BLACKSMITH for some time, but have been silent until now. My shop is 30 by 45 feet, and is run by a two-horse International engine. My equipment consists of a band saw, a turning lathe, a power drill, full mounted Green River Screw plates, and various other



WELDING IRON TIRES

tools too small to mention. I make wagon work a specialty, but do shoeing, plow work, and all kinds of repairing. I have a helper a great deal of the time, and heartily agree with some smiths in regard to staying in the shop at all times. I think if a man sticks out his sign he should be at his anvil six days out of a week, and the seventh day go to church, sabbath school, or some religious gathering. I would like some of the brothers that are older at the business than I am, to give me some plans for a good wheel bench to drive spokes on, and their way of keeping the spokes perfectly level on top, and true. I will give some of the prices we receive here:

4 new shoes and toes	$1.10
4 new shoes, plain	.80
4 old shoes	.40
Wagon wheels filled, each	3.00
Wagon wheels spoked, each	2.25
Wagon pull or tongue	1.50
Wagon box complete	12.00
Wagon tires set	3.25
One-horse plow stocks	1.50
Two-horse plow stocks	2.00

Our other prices are in proportion to these, which you will see are very low.

C. F. R.

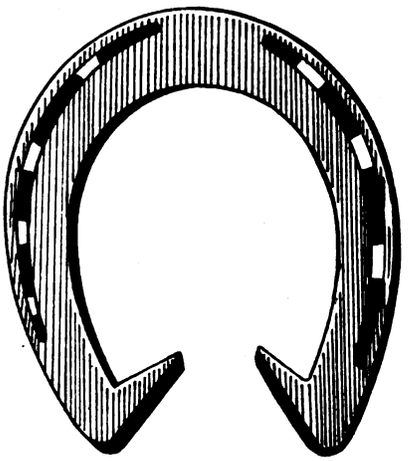
Grab Hooks and Wide Tires.—I heard a timber man say once, and I found it true, that a pair of grab hooks will have the proper shape, when you hold them up by the edge, and let the hook hang down, and the point of the hook points right at your eyes. If the smith will punch a ⅜-inch hole through his wide truck tires, and have a good, deep forge fire; if he will heat his tire slow at first until just before he takes it out of the fire, and then heat fast, use plenty of good, clean sand to keep it from burning, he will be able to do the work satisfactorily. The heat will come through the ⅜-inch hole in the center of the tire, and make it heat same as the edges. When hammered down, the hole will fill up.

I have not worked at the smith trade now for four years. I am in a sash and door factory, where all kinds of mill work is done, also cabinet and all kinds of bench work in the wood line or carpentry. We work altogether from blue print. When I first started to work from blue print I did not like it, but now I would not work any other way. It is the best on every job that amounts to anything. It saves lumber and iron, it saves long study, it saves long explanations to your men. I read THE AMERICAN BLACKSMITH regularly, however, and I claim to be an all-around man. At this writing I am building a ten-H. P. yacht or boat, which will cost about one thousand dollars. Any time I can do the craft any good, I am willing to tell them what I can and am willing to take good advice.

A READER.

An Interesting Letter from Texas.—I would suggest to the trade a plan for mutual help in collecting accounts. When a customer quits, or leaves without paying up, forward the bill to the smith or smiths where he locates. This bill to be paid before his name can be entered on the books for future credit. I would like to correspond with all in Texas who are willing to discuss this matter.

I have been pleased with many of the articles on shoeing, and think no one should be allowed to put on a shoe before he has passed an examination before proper authorities, and a license be granted. I would propose that the Society of Prevention of Cruelty to Animals be authorized to keep a vigilant watch on all shoeing shops.



A SHOE RECOMMENDED FOR CORNS AND TENDER HEELS

There is one style of shoe which has not appeared in "Our Paper," which I have used for many years for tender heels and corns. I draw the heels of the shoe to a cross chisel point, and turn them short inwards to cover the bar of the foot. It gives more standing room on the shoe, and a better hold than a calk on the road, if slippery. I believe that, where possible, all shoes should on the ground-side be on a level with the frog of the foot. W. S. MACKRELL.

A Letter from Virginia.—I see lots of letters of how the smiths have started, I will tell some of my own little experiences. When I was about 15 years old I wanted my father to get me some tools, but he thought he could not spare the money, as he was about $1,200 in debt. Finally he gave me a calf. When this was three years old I raised a bull calf from it, and kept him till he was four years old. I then sold him for $27.50, and bought a bellows, an anvil, a vise, and a few small tools with which I could shoe the horses. Later on I bought a blower, a post-drill, and another anvil. With this outfit I could do lots more and better work. I used these three or four years and then went to a railroad shop, where I worked four months. But I could not do my friend the horse any good there, so I went back home and worked on the farm and shod horses and sharpened plows. I also did some work for the neighbors. In the fall I took my gun and went deer-hunting. One day I came out of the woods, gun in hand, and stopped at a lumber company's plant, and asked if they needed a blacksmith. They said "Yes. Are you a blacksmith?" I said I was. They asked if I could weld iron and shoe their horses, and I told them that I could. They said they would give me a chance. The price was $2.50, if I could do the work. They gave me a chain to mend, and found I could do the work well. I worked three or four months, asked for a raise, and they raised me to $2.75. I am still here at the anvil, and in my 16th month, and have the name of the best smith of the five or six they have had

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before. I am 31 years old, I have been at the smithing for the past two years, and have learned by myself many things I never knew before. O. W. MARTENEY.

Answers to Several Questions.—I have been working at the trade for about 16 years. I began by doing my own work on the ranch and after a little practice, I found I could do any job I tackled. I am now running a shop of my own, and can fix any job that comes along. In regard to setting tires, I never heat the tire hot enough to burn the wood, and run the tire and the wheel three times, to be exact. If not sure then I run them again. I have never dished a wheel, in fact, I guarantee to furnish new ones in case I do. Wm. H. Oblad asks to fix a boxing where the wood is worn away at the end. I would use babbit metal. A high wheel wagon runs easier than a low wheeled one, and the best thing I ever used to stop an axle from cutting was common stove blacking, pulverized in castor oil. Now I want to tell you how I put a cliphorn on my anvil. I am left-handed, so I could not buy an anvil to suit. I took my hack saw and cut in from top clear to bottom at base of horn ½-inch deep, wider at top than bottom of groove. I then chiseled out about two-thirds of the way down, fitted a cliphorn out of an old cold chisel, and dovetailed it in. It is as solid as if cast on the anvil. This is a particular job, though not a difficult one. There are certainly some horseshoers who never learn anything. I shod a horse a few days ago that had no inside braces, they having been entirely cut out. This, I think, is a bad mistake, as is also rasping the hoof. We have organized here for better prices, but there are a few who stick to the old price, but I think they are finding it hard to get stock. J. N. SEARS.

Corns and Quarter Crack.—In answer to question of Mr. Tob Cotton's in the March number; "Do shoeless horses get corns?" I will say that I have met with several in my experience, while shoeing for the cowboys in the ranges of Montana. I came to the conclusion, in studying the cause, that they were caused by picking up a stone in the mud adhering to the foot in winter, and being frozen in the hoof until it bruised the foot sufficient to cause corns. These cases were found in horses that had never been shod. My treatment for corns is to pare them out as much as possible, without bleeding, and put into the cavity a pinch of sulphur, light with point of hot iron, and burn until consumed. Then melt a little rosin and cover with this to protect. This repeated at the next shoeing will cure the most obstinate case. Of course the shoe should be fitted to remove pressure.

In the same issue I saw an article from W. H. Morrow, "To Cure Quarter Cracks." I will state how I treat them. I first shoe the foot. If the quarter crack has separated the heel so as to lame the animal, I take all pressure off, and then burn the crack with hot iron (about ⅜ round, curved at end). Remove the shoe within four weeks, reset and repeat treatment. Burn the full length of the crack, up into the coronet. I have treated a great many cases this way, and have always been successful when allowed to treat for three or four months. Ordinarily the horse will be able to continue working without lameness. I have had nearly 30 years' experience at the anvil,



THE VILLAGE WHEELWRIGHT
MR. W. S. MACKRELL, WHO RUNS A TEXAS SMITHY

and have been a subscriber to THE AMERICAN BLACKSMITH ever since its initial number. I believe in profiting by the experiences of others and believe that the "green helper" can sometimes teach the "boss" a "trick worth knowing" and one of value. E. SWOPE.

Filling Sarven Wheels—I have been in business five years, and had but very little knowledge of it when I went in. But, by studying the articles of different craftsmen, and by using the best of knowledge I had myself, I have built up a business that can't be beat.

I have read several articles on how to fill a Sarven wheel; so this time I will tell how I fill one, and I have never had one to come back. First, I remove all the rivets, and then take out the old spokes, and if the bands are bent or crooked I knock them off, and take them to the anvil and strengthen them. Then the hub is ready for the wheel-horse. I put on my gauge, and drive every other spoke, glueing the points with hot glue. Then I glue the rest of the spokes, points, and shoulders, and if my bands are tight I glue both top and bottom before I drive them. But if my bands are not tight then I don't glue top and under sides. When I have my wheel filled, and the spokes are all straight I drive off the bands if loose, and fill with glue. Then drive on and take a seven-eighths or three-quarter bolt long enough to go through the wheel with a heavy half-inch washer on both ends and a full nut. Then tighten all the bolt will stand. This way you will get your bands tight, and it is a good idea to take a hammer, and tap the bands so as to draw them. When you have your bands as tight as you can get them, tap the spokes to see if there are any loose ones. Then your wheel is ready to bore and rivet. When you have got the rivets all set firmly, remove your bolt, and the wheel is ready for the felloe.

In filling a wheel this way, the sooner you get the bolt in, and the bands pressed together the better will be your job. Try this way if you like. If you have one that beats it let us know. I hope to write again, and tell how to fill a rubber-tire wheel without removing the tire. And I will tell the smith how to cut a thread in a large hole with a small tap, so when a job out-of-the-ordinary comes to him he will not have to turn it away, because he cannot do it, W. A. M.

A Virginia Price List.—I thought I would tell my brother craftsmen of the prices, and the different kinds of work we do down here. My principal work is horse-shoeing and general repair work, with some new work. I hire a smith to run the smith shop, while I do the wheelwrighting and the particular part of the smith work, such as shoeing colts, as I consider that the most particular part of the trade. Always start a colt right, and you will not have any trouble in the future. I broke about 150 colts last year, and didn't hit one of them. I have no use for shoeing stocks, wouldn't give them room in my shop. I use the stocks called patience and kindness. I weigh 140 pounds, and have shod horses that have been turned down by men weighing 180 pounds. The following are some of my prices:

Plain	$1.00
With toes	1.20
New tire ⅞ by ¼	4.00
New tire 1 by ¼	4.75
Setting buggy tire	1.50
Setting two-horse tire	2.00
Four-horse or 2 by 1	3.00
Four-inch	4.00
Pointing plow shovels	.25
Axles from	$1.00 to 3.00
Tongues	$1.50 to 2.00
Bolsters	1.50
Hounds	$2.00 to 3.50

We do not have any heavy plow work, as farmers use the cast-iron plows. My tools consist of a blower, a tire bender, a Wolff's cold tire setter, a Buffalo drill, a 5-inch vise, a set of screw plates, and an anvil. In my wood shop I have a two-horsepower International gas engine, a band saw, a circular saw, a wood lathe, and a jointer. I have noticed a good bit of talk about the cold tire setter Some are down on them like a hundred bricks. Say, brothers, have you ever tried one? If you have not just get a machine, and with some judgment in using it, you will change your views. I used to be down on them, until I was persuaded to try one, and I felt sure I did not want the thing. But after I tried it for 30 days, I just settled for it. Now I would not do without it for anything, and I think I know when a job is right, at least, my customers all want the machine work. I insure all work done on the machine to last 12 months. I haven't had a single customer come back yet, and I have had it three years. JOS. A. CRIM.

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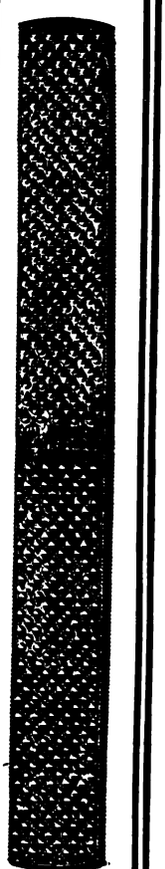
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Prices Current — Blacksmith Supplies.

The following quotations are from dealers' stock, Buffalo, N. Y., May 1, 1907, and are subject to change. No changes have taken place since last month's quotations.

All prices, except on the bolts, are per hundred pounds. On bars and flats prices are in bundle lots.

Bars—Common Iron and Soft Steel.

¼ in..	round or square;	Iron, $2.95;	Steel, $2.95
⅜ in.,	" "	" 2.55	" 2.40
½ in.,	" "	" 2.35	" 2.20

Flats—Bar and Band.

¼ x 1 in.,	Iron.....$2.40;	Steel.....$2.40
¼ x 1½ in.,	" 2.30;	" 2.80
5-16 x 1½ in.,	" 2.50;	" 2.50

Norway and Swedish Iron.

¼ in., round or square	$4.90
⅜ in., " "	4.50
½ in., " "	4.30
½ x 1 in	4.80
¼ x 1½ in	4.20

Horseshoe Iron.

For No. 1 shoe, ⅜ x ½ in	$2.50
For No. 2 shoe, ½ x ⅝ in	2.50
For No. 3 shoe, ⅝ x ¾ in	2.50
For No. 4 shoe, ⅝ x ⅞ in	2.50

Toe Calk Steel.

½ x ⅜ in. and larger... $3.00

Carriage Bolts. (Net Price per Hundred).

¼ x 2 in	$0.54	⅜x2½ in	$0.82
¼ x 2½in	.58	⅜x3½ in	.96
¼ x in	.62	⅜x6 in	1.31
5-16x 2 in	.65	½x4 in	1.70
5-16x 3 in	.75	½x6 in	2.10

Spring Steel.

⅝ to 1½ in. Rounds. Op. Hearth $3.00, Crucible $5.00
1¼ to 6 in. by No. 4 gauge to ½ in. Flats " 3.00, " 5.00

PATENTS FRANKLIN H. HOUGH. Washington, D. C. No attorney's fee until patent is allowed. Write for Inventor's Guide.

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Write for 1907 net price CATALOG just out. IT'S A MONEY-SAVER.

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BUOB & SCHEU, Cincinnati, Ohio.

WANTED—Ambitious men to act as agents for our fine line of calipers, etc. Address
E. G. SMITH CO., Columbia, Pa.

FOR SALE—Neverfail brazing compound for cast iron, etc., sure and simple. Put up in $1, $2.50 and $6 lots. Neverfail Brazing Co., LeMars, Iowa.

FOR SALE—Blacksmith and wagon shop with power, tools, stock and dwelling. Address
E. E. HULL, Jesup, Ia.

WANTED—Salesmen for Extension Axle Nuts. Sure cure for wabbly buggy wheels. Exclusive territory. Big commission. Special introductory offer. HARDWARE CO., Box Z 10, Pontiac, Mich.

FOR SALE—Blacksmith and wagon shop, size 24x50 feet, Thirty miles west of Kansas City in the business part of the town. Steady work for two men. Address JOS. ZILLNER, Endora, Kansas.

FOR SALE—Blacksmith shop, 20x40 ft. Also stock and tools. Located in a good, lively, small, town. Will sell cheap. Write for particulars.
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FOR SALE—$100 cash buys a new 8 H. P. gasoline engine complete. Never been out of crate. Worth $140. Only one for sale, so write quick.
D. S. WALLACE, 114 Liberty St., New York City.

FOR SALE—Blacksmith and wagon shop, house, two lots and tools. Only shop in town and a fine location for a fair smith. Two churches in the town. For further particulars write to
AUGUST MINGE, Breckinridge, O. T.

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L. F. GRAMMES & SONS, Allentown, Pa.

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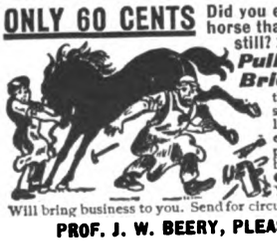
FOR SALE—House Cold Tire Setter at half price. Machine is as good as new and equipped with all attachments, but having no use for it, as we are in the automobile business, will sell it at a very low price.
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FOR SALE—Shop and tools for all general repairing. Gasoline engine, trip hammer, tenoning machine, cold tire setter, etc. Good thriving railroad town in best part of Kansas. Big trade for two men. Reason for selling, too old to work at trade. H. J. DUBB, Ransom, Kas.

FOR SALE—Two story blacksmith and wagon shop, 24x48 feet, one story addition, 18x20 feet. Good gasoline engine, tools for two blacksmiths and wagon makers. In good farming country. Price very reasonable and easy terms made.
T. B. TWEET, Radcliffe, Iowa.

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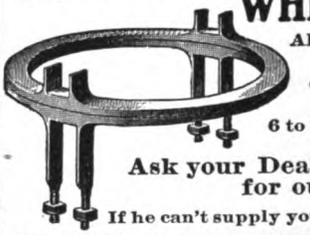


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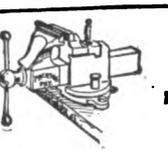


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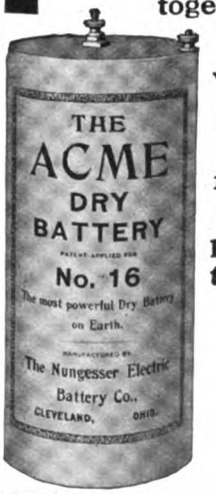
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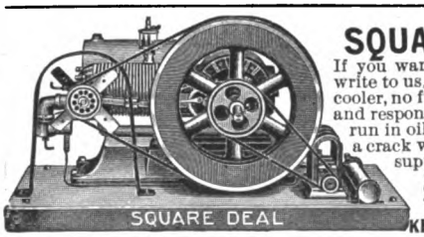
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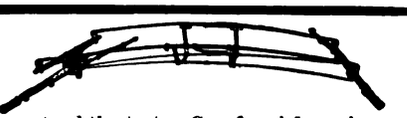
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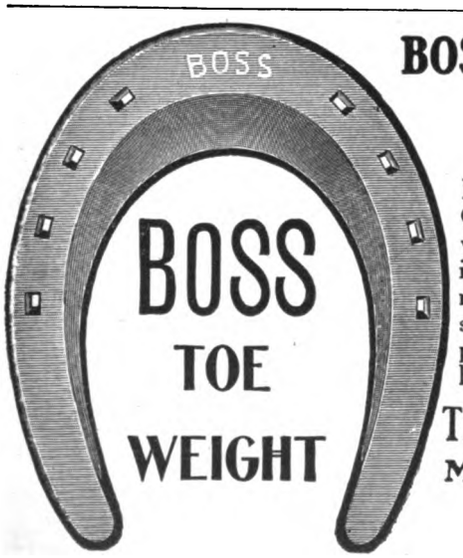
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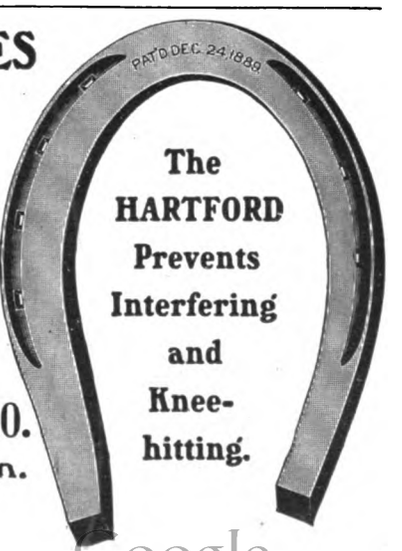
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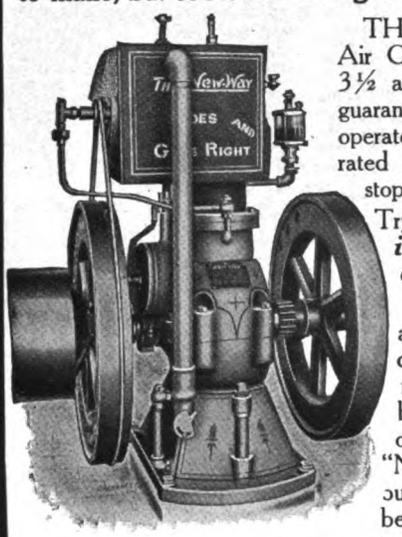
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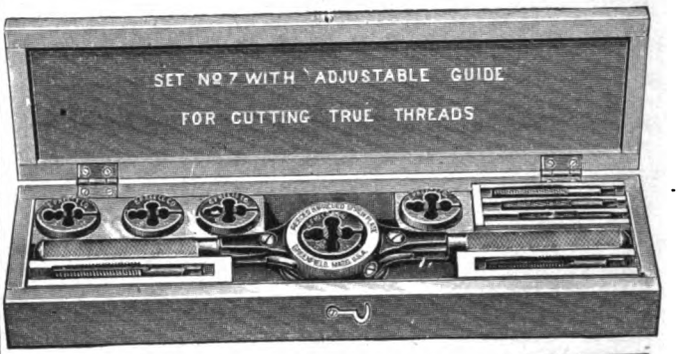
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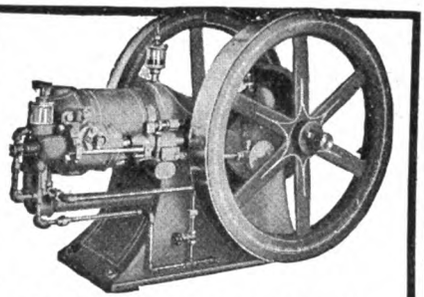
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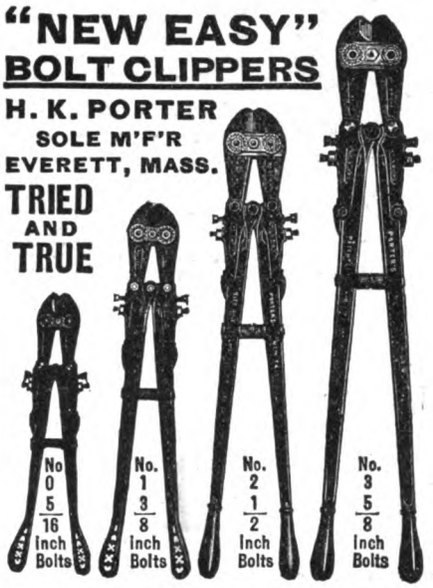
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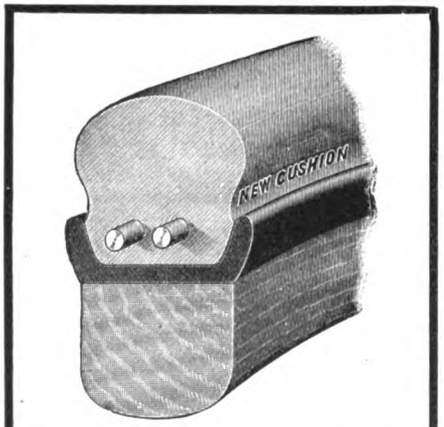
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H. K. PORTER
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EVERETT, MASS.

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REFUSE CHINESE IMITATIONS OF THESE TOOLS; THEY ARE INFERIOR.



Our New Two-Wire Cushion Tire

Broad Face, easy rider. Made in ¾, ⅞ and 1 inch sizes only. Fits regular standard channel,

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BARRETT'S Pure Paint Products

Specially adapted to Carriage work. We make the "one thing best suited to your purpose." We want to send out ten thousand samples during 1907.

A sample will make you a Customer.

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It costs you nothing to investigate and it pays.

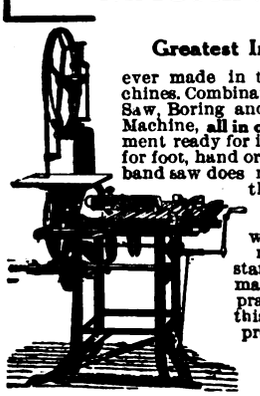
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Manufacturers **Dayton, O.**

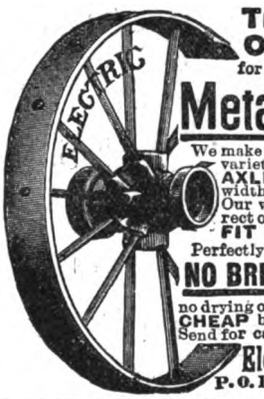
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Greatest Improvement

ever made in this class of machines. Combination Rip Saw, Band Saw, Boring and Spoke Tenoning Machine, **all in one.** Each attachment ready for instant use, either for foot, hand or belt power. The band saw does not interfere with the circular saw, the operator stands at the side while the man running the rip saw stands in front of the machine. The new practical features of this machine are appreciated by every customer.

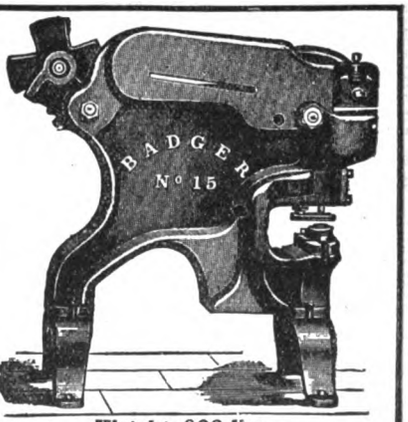
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for all time is the....
Metal Wheel

We make them in all sizes and varieties, **TO FIT ANY AXLE.** Any height, any width of tire you may want. Our wheels are either direct or stagger spoke. Can **FIT YOUR WAGON,** Perfectly without change.... **NO BREAKING DOWN** no drying out, no resetting tires **CHEAP** because they endure. Send for catalogue and prices.

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Weight 800 lbs.

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Here is a Punch and Shear that will punch and shear just as we say with

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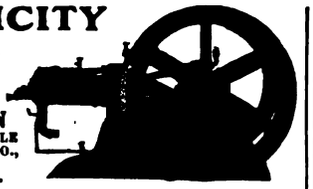
Punch ⅝ in. hole in ½ in. Iron
Shear 4 x ½ in. Flat Iron
" 7 x ¼ in. Band Iron
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Rock River Machine Co.,
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ALL SIZES
GET OUR PROPOSITION
WESTERN MALLEABLE & GREY IRON MFG. CO.,
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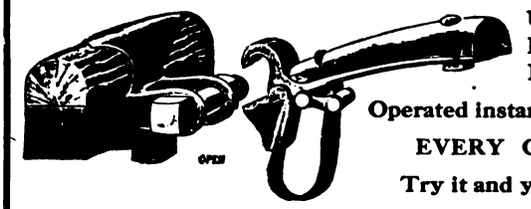
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Special Net Price on Sarven Patent Wheels (C. B. 50c. extra) with steel and rubber tire

Size of tread	Price per set for wheels with flat steel tire on and hubs bored	Price per set for wheels complete with channel and rubber tire on, and hubs bored. 36 and 40	38 and 40	40 and 44	Add to price of wheels for axles and boxes set
3/4	$6.25	$13.20	$13.40	$13.60	$1.90 L.D.
7/8	6.50	14.50	14.80	15.10	1.90 "
1	6.75	16.00	16.30	16.60	2.10 "
1 1/8	8.25	24.00	24.75	25.50	2.25 H.P.

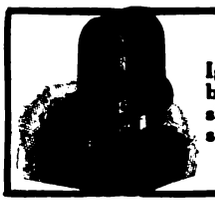
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Prompt shipments.
Five sets or more, one order you can deduct 25c. per set as freight allowance. Write for catalogue. We manufacture wheels with Steel or Rubber Tire on 3-4 to 4 inch tread. Buggy Gears with wheels and shaft all ready for body, $16.50
The A. Boob Wheel Co., Cincinnati, Ohio. U. S. A.

OVER 1,000,000 STANDARD COUPLERS
SOLD DURING THE PAST FOUR YEARS



Used with regular shaft shackle.
Fits any size bolt perfectly.
No loose bushings.
Operated instantly. Perfectly made.
EVERY COUPLER WARRANTED.
Try it and you will never use any other.

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Send for our new catalog containing over 400 devices used by the carriage trade.

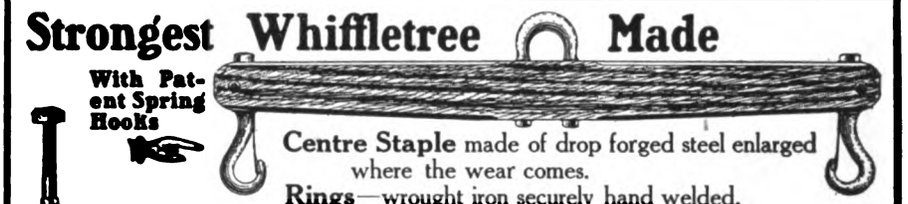


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Ignition Generators do away with EXPENSE and TROUBLE of batteries. Can be easily installed with any engine and is very simple. This Magneto regulates its own speed and furnishes constant spark at all times. INFORMATION ON REQUEST.
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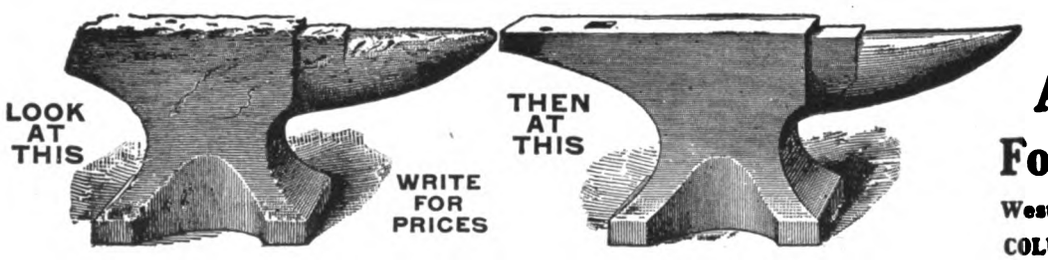


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Centre Staple made of drop forged steel enlarged where the wear comes.
Rings—wrought iron securely hand welded.
Patent Spring Hooks fit any square or round end whiffletree. Ask your dealer for the A. M. W. line, or write for descriptive circular and price list.
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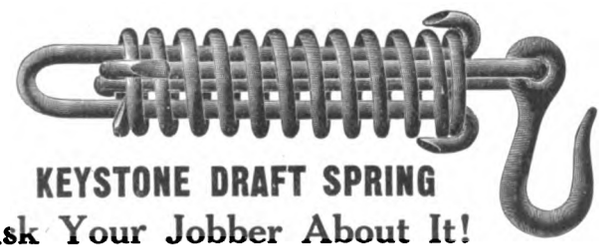
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Tools and Supplies for Horseshoers and General Blacksmiths
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less than you can buy a similar style from certain high-grade builders, upon whose work dealers cannot make the same percent profit as on ours.



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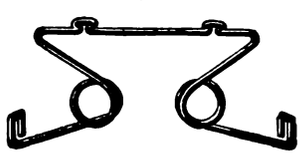
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Fits any Farm Wagon.



The only COIL tongue spring that can be attached without removing queen bolt

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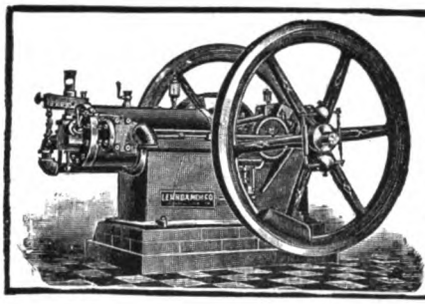


1,000 lbs. capacity per pair. Only four bolts required to attach

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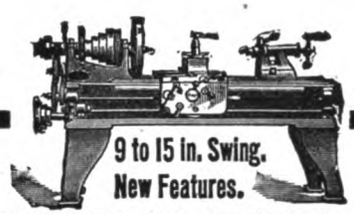
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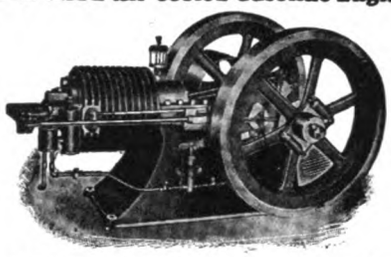
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Our engine lathes are provided with both screw and rod feeds as well as power cross feed. Gears to cut all standard threads from 5 to 36 are furnished. Steady and follower rests, large and small face plates and countershaft go with each Lathe. Foot Lathes, Tools and Supplies.

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The GADE Air Cooled Gasoline Engines



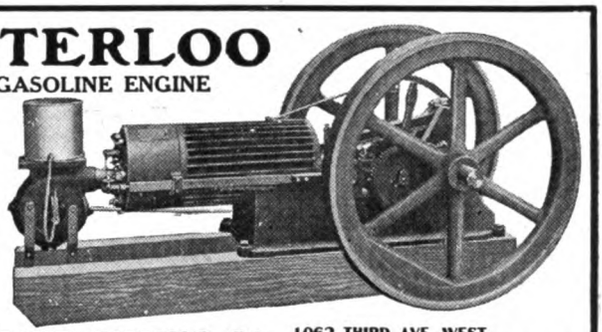
Made in 2, 3 and 6 horse power sizes. What's the use of paying good money for an old style engine, when you can get something better in the "Gade Air Cooled" at the same cost Buy one. It will not freeze up or go back on you in cold weather. It's ready for business all the time. We know it will please. By all means write for descriptive circulars and price list of the "Gade." Address, GADE MFG. CO., Iowa Falls, Iowa.

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Positively frost proof and cannot freeze. The King of all Gasoline Engines. Our illustrated Catalog will tell you all about it.



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Will turn off blue chips on any kind of work.

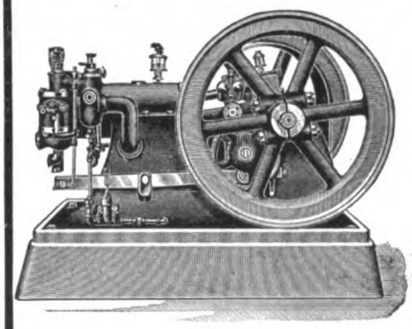
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The ideal power for shop or farm. Economical of fuel. Easy to start. Speed regulated while in motion. Built on advanced lines. Satisfactory wherever installed. Send today for Catalog A—FREE—full of information.

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The "Boss" Aprons come complete either with or without bib. They have brass eyelets and leather straps, and every possible convenience.



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These are the reasons why STANDARD TOE CALKS GIVE SATISFACTION, why more STANDARD TOE CALKS are sold than all other makes combined and why the man who makes his Calks is becoming as rare as the man who makes his Horse Shoe Nails.





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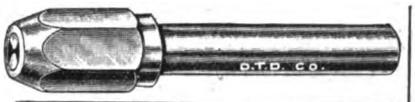
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that will fit the spindle of your drill press, holding **GROOVED SHANK** drills ¾ to ¼ in. inclusive, with reducer to ⅜? Drills held by this chuck are much cheaper than drills with ½ in. or ⅝ in. shank. Simplest and cheapest chuck on the market.

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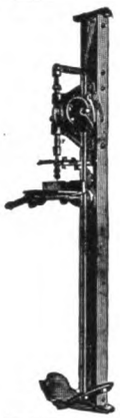
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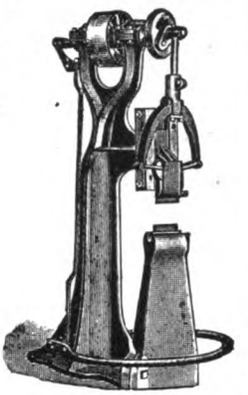
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Universal Tenon AND Boring Machine

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Vulcan Power Hammer,

Only perfect adjustable stroke, operated entirely by treadle.



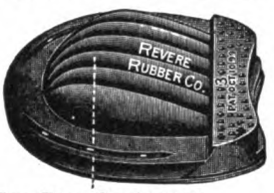
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It fills with air at each step. That's what breaks concussion. That's what prevents slipping. That's what keeps the foot healthy. That's what cures lameness.

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NO LAMENESS NO SLIPPING CHEAPEST AND BEST



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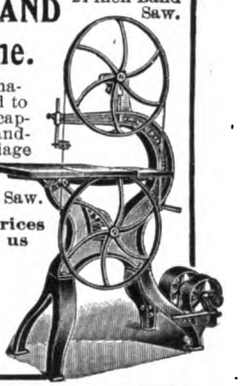
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BUILT TO STAND the Test of Time.

24-inch Band Saw.

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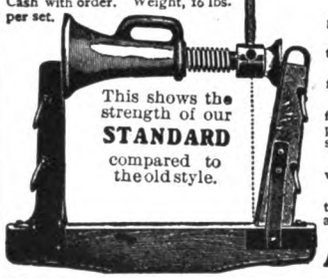
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We make the following sizes:

No. 1, 3	In. wide,	14 in. high
" 2, 3¼	"	14 "
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Price, $1.65 per set of 4 stks
Cash with order. Weight, 16 lbs. per set.



The Bruce Malleable Wagon Standard

This Malleable Iron Bolster Standard has been tested thoroughly, and we guarantee it strictly as represented.

Anyone familiar with the farm wagon will readily see the great advantages of the Malleable Iron Bolster Standard over the old style.

1. Made of the best grade malleable iron. It has been thoroughly tested by factories and wagon makers and pronounced a great success.

2. It is attached to bolster by means of two bolts passing through bolster from the side, and one bolt from top to bottom of bolster, thus holding standard perfectly solid, and at the same time strengthening end of bolster, which in old style is weakened by mortise.

3. The Malleable Iron Standard has a 3 1-2 in. face at base, which prevents wear on wagon box, while the old style has only a 7-8 inch face.

4. Great time saver. Can be attached to bolster in one-fourth the time required to put on wood stake. Adapted to new and repair work. The price will justify all classes of the trade in using this standard.

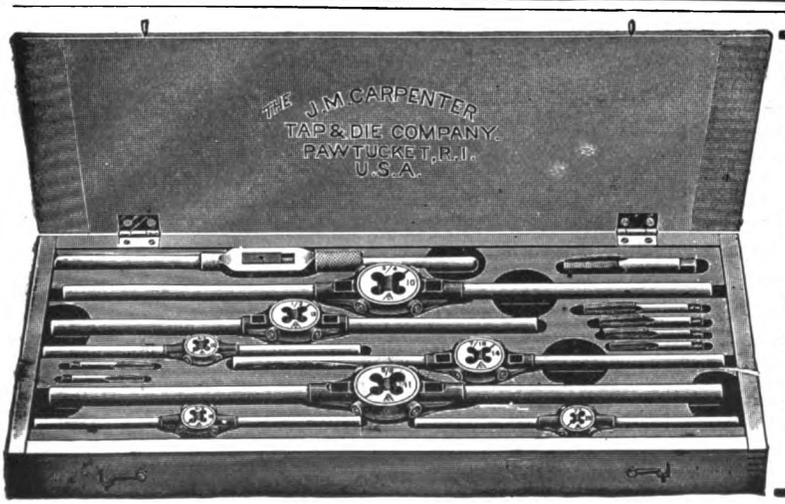
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CHURCH BROS., AFTON, N. Y.
$1.00 per Box, by Mail. For Horses and Cattle.



CARPENTER'S NEW FULL MOUNTED DIE SETS

With a stock for each die and the Original Nichols Tap Wrench.

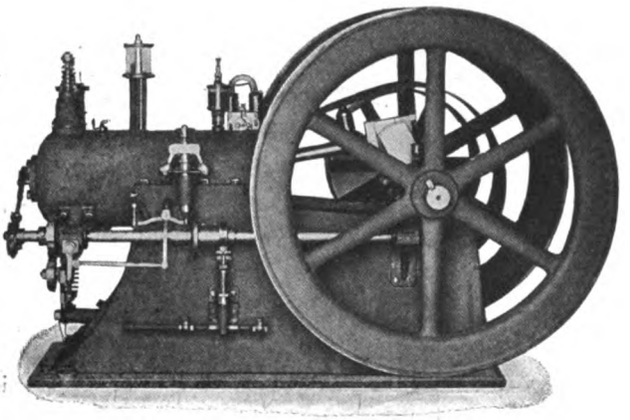
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BUY WHEELS DIRECT FROM THE FACTORY

We can save you money on all sizes of wheels; in the white, painted any color and with steel or rubber tires. We bore wheels for boxes without extra charge. Give us a trial order and we will make you one of our many satisfied customers. Write for special prices to *American Blacksmith* readers.

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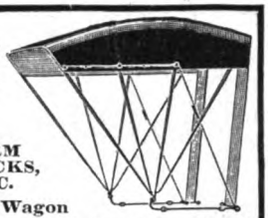
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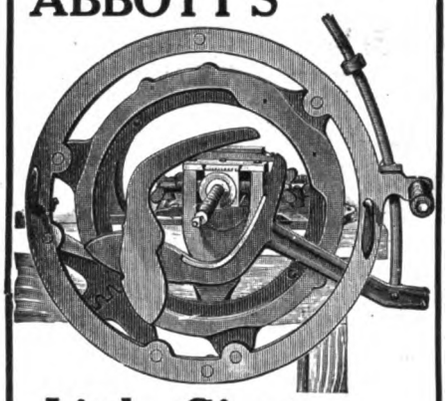
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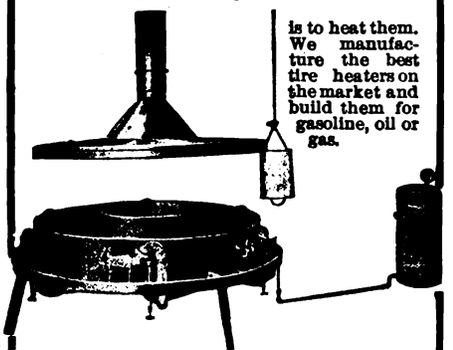


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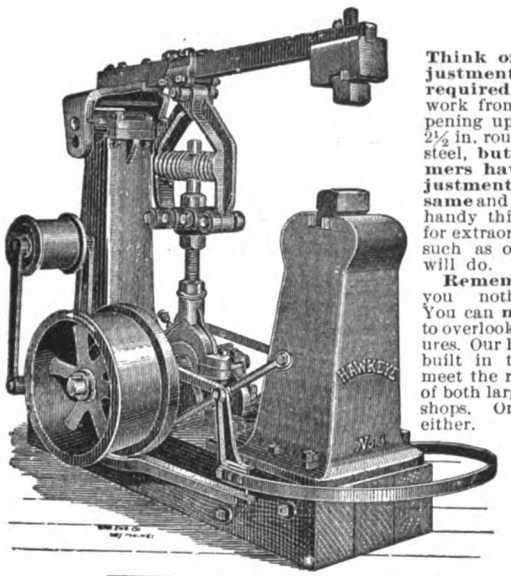
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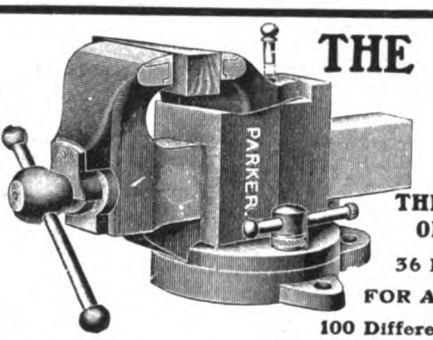
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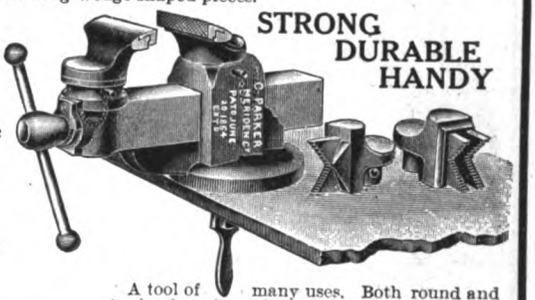
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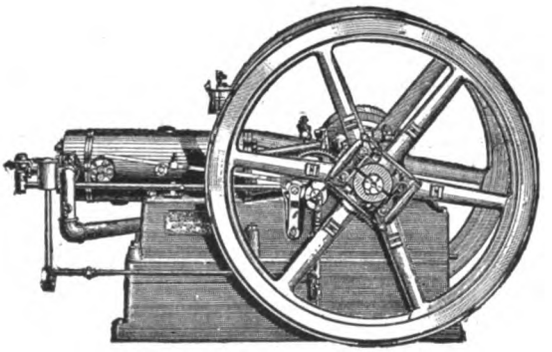
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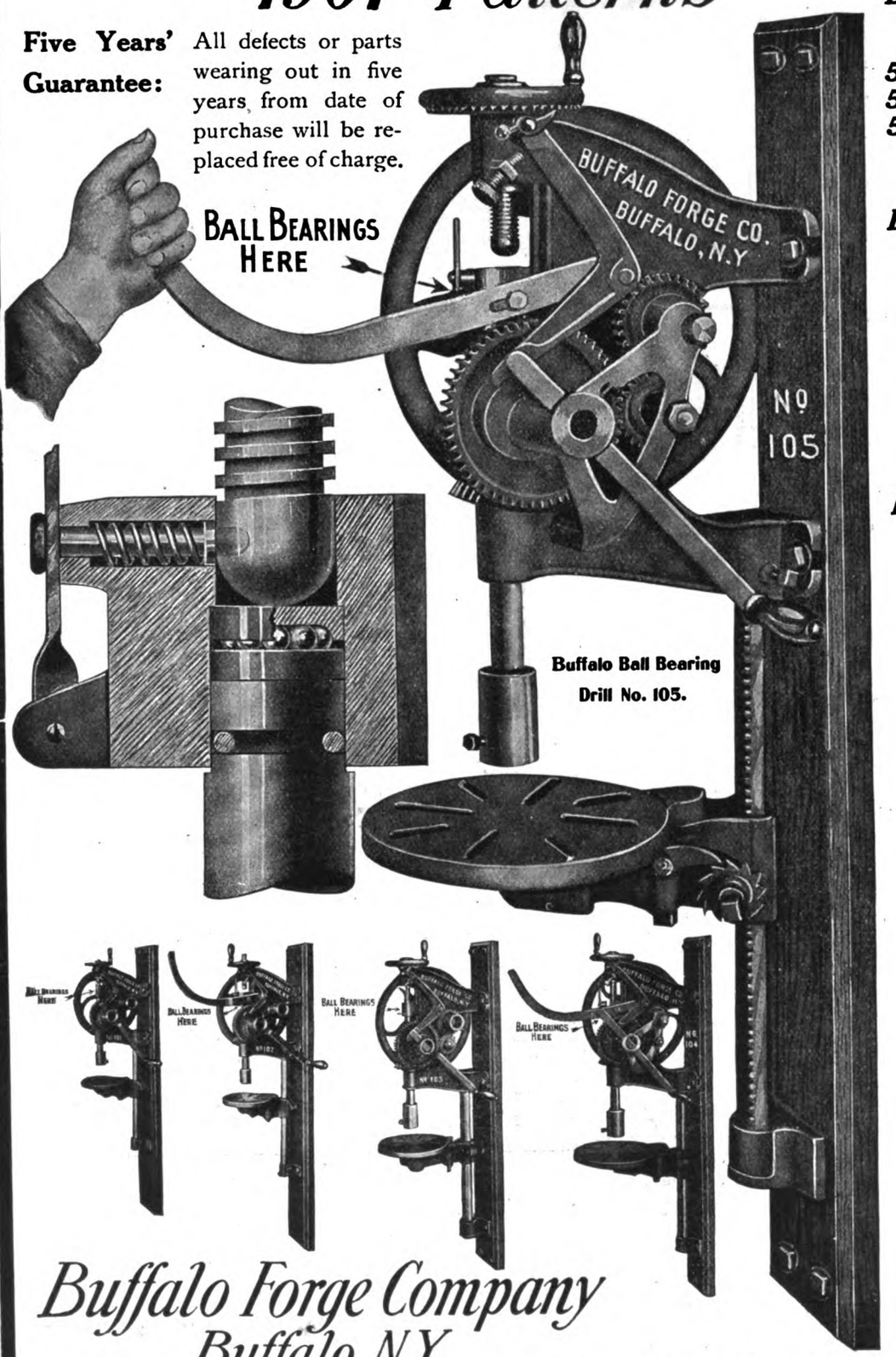
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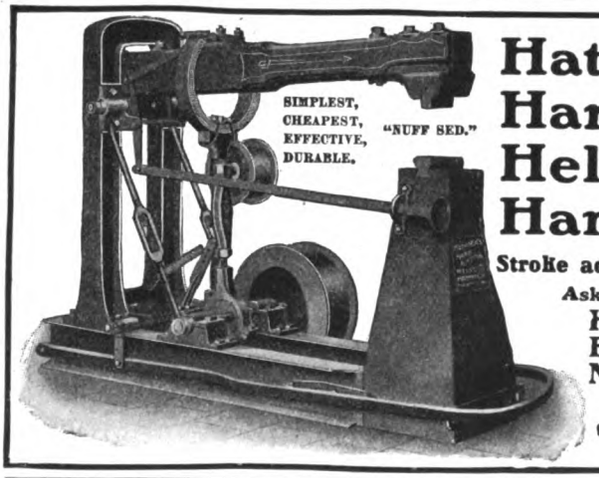
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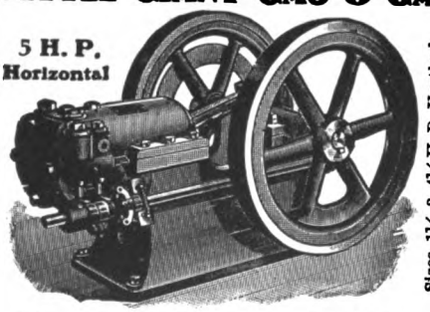


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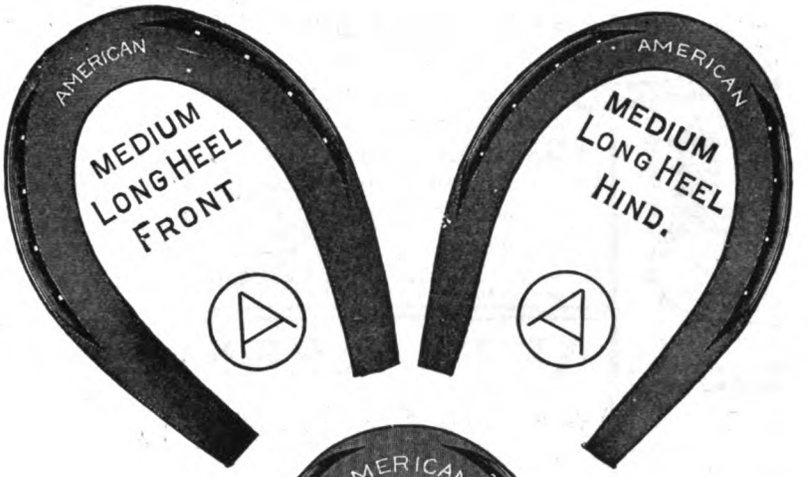


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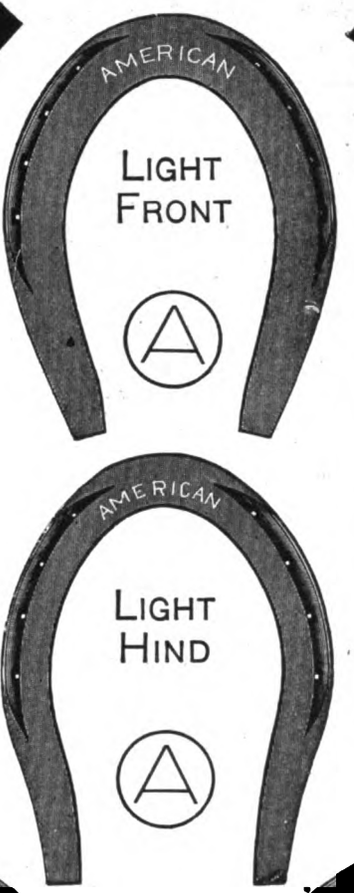
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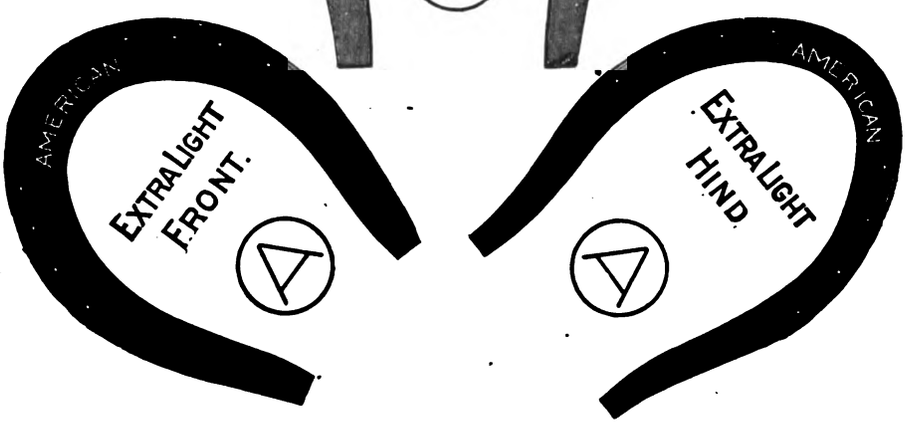
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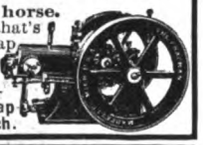


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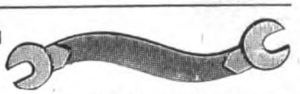
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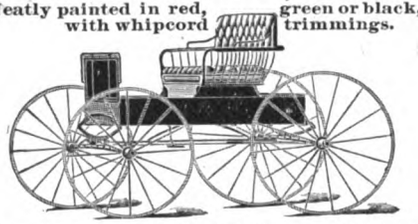
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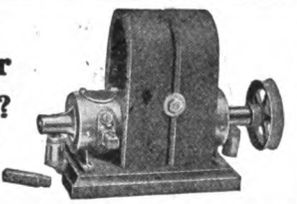


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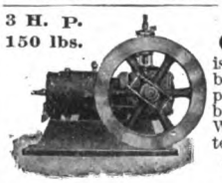
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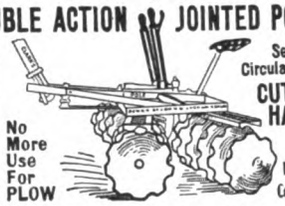
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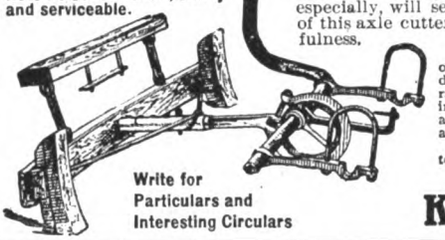
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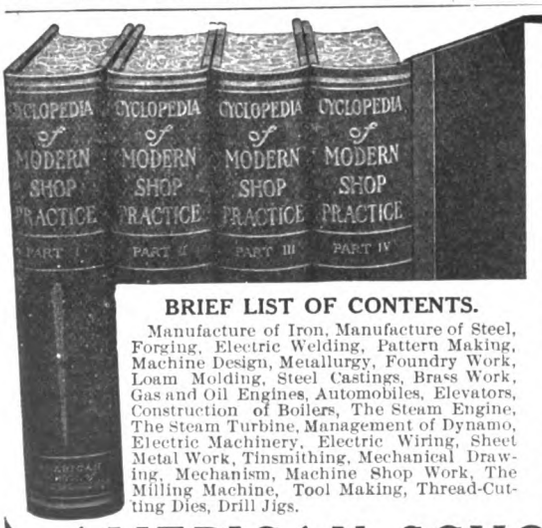


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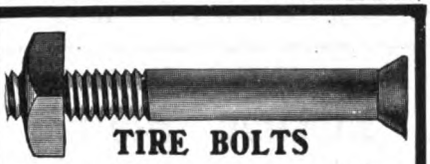
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Send postal card for our Free Carriage CATALOG, with over 70 different styles, and Wholesale Price List.

ROCHESTER VEHICLE CO.
366 Main St. East,
ROCHESTER, - NEW YORK.



TIRE BOLTS

On page 149 of our new 1907 catalog you'll find our great special offer on Tire Bolts. LOOK FOR IT.

AXLES



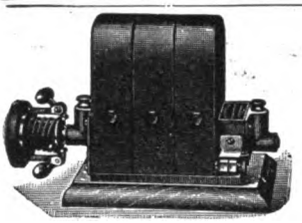
We have a most complete stock of axles, and also quote money-saving prices on them, which you'll find on page 158 of our new catalog. DON'T MISS THIS. Everything sold on a money-back basis—YOU can't lose.

BE WISE SAVE MONEY

SEND US YOUR ORDERS

Write for our FREE 1907 304 PAGE CATALOG.

CRAY BROTHERS
1247 W. Ninth ST.
CLEVELAND, OHIO.



HENRICKS MAGNETO

Fires your gas or gasoline engine without the aid of batteries.

It is better and more durable than any Dynamo. Its Governor regulates the speed regardless of speed of Fly Wheel. Its Governor adjusts to imperfect Fly Wheels. Its Governor insures a constant and uniform spark. The spark does not burn the contacts of the engine. All strains are removed from the bearings of Magneto. FULLY GUARANTEED. AGENTS WANTED.

HENRICKS NOVELTY CO.
130 S. Capital Avenue INDIANAPOLIS, IND.

MURDER

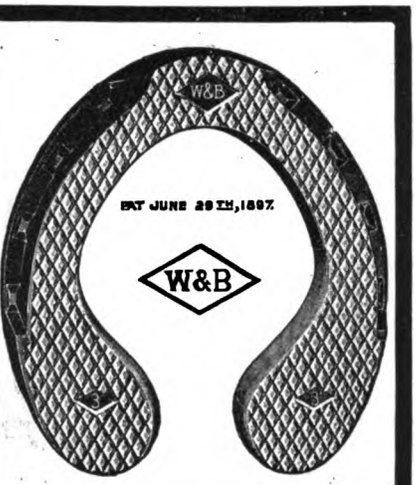
IN THE FIRST DEGREE!!

This 2½ H. P. Gasoline Engine

That we will sell for a limited time for $48.50 is worth and sold by anyone for $125.00. This is really murdering everybody's price. The engine is furnished complete on skids ready to run.

Second Degree Prices on the 3¾, 5, 6, 8, 10 H. P.
Get next quick.

C. A. DISSINGER & BRO., WRIGHTSVILLE, YORK CO. PA.



In the Natural State

the hoof of the horse comes in contact with Mother Earth and is perfectly bare. This condition permits free access of natural moisture and fresh air to the frog and other parts of the hoof and the hoof being bare, the frog can expand.

For the horse in service it is necessary to protect the hoof from contact with hard roads, and the closer we can stick to nature and yet give the necessary protection, the better for the horse.

Of all hoof protections the "W & B" Rubber Pad Shoe is undoubtedly the best because, being open, it does not cover the hoof, but permits the natural moisture and fresh air to reach the frog and other parts, keeping the hoof healthy, and as the heavy rubber pads at the heel are resilient, and the shoes do not cause the frog to contract, but rather allows it to expand as nature intended.

The protection is ample, as the frame of the shoe is drop forged from steel, and the channels, both upper and lower, are filled with high grade rubber, thoroughly vulcanized.

The "W & B" Rubber Pad Shoe is fitted cold and applied much quicker than the iron or steel shoe; therefore the shoer increases his profit by using it.

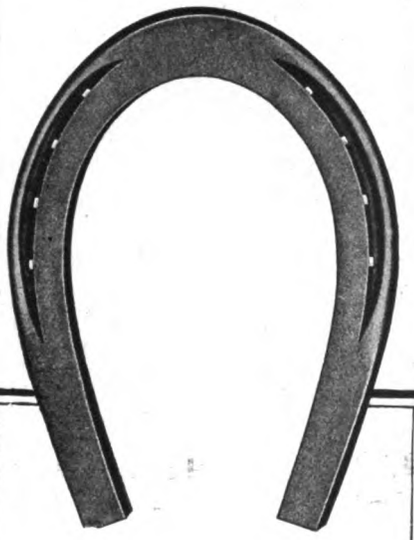
Carried in stock by all of the leading Blacksmith Supply Houses.

If your jobber does not carry it, write us.

The Whitman & Barnes Mfg. Co.

GENERAL SALES OFFICE,
CHICAGO, ILLINOIS

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WHEN YOU BUY HORSE SHOES

Is it not preferable to make your selection from the most complete line and the best shoes on the market?

UNITED STATES HORSE SHOES

"In a Class by Themselves"

OUR Illustrated Catalogue shows all sizes and patterns. The book is free. We will gladly send a copy to your address. Write today

We are giving away a handsome souvenir stick pin to every smith who sends his name and address. Did you get one? Don't wait until they are gone. Write today.

UNITED STATES HORSE SHOES
— ARE SOLD BY —
LEADING JOBBERS
EVERYWHERE

United States Horse Shoe Co.

ROLLING MILLS and FACTORY

Erie, Pa.

Vehicle and Automobile

BOWS

S. N. BROWN & CO.,
DAYTON, O.

ECLIPSE
GAS AND GASOLINE ENGINES.

Vertical 2, 3, 4, 5, H. P.
Horizontal 5, 10, 12, 15, 20, 25, H. P.

Designed and Built for BUSINESS.
Catalogue on request. . . . . .

MYRICK MACHINE CO., Olean, N.Y.

NEW ERA
Electric Blower

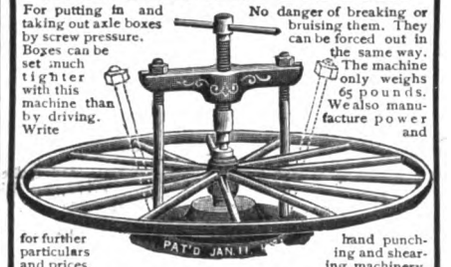
Direct connected, has been designed especially for the blacksmith and it is his ever ready helper that works for less than five cents per day.

It never tires. It places him on equal footing with the largest steam shops and allows him to work at the anvil steadily while electrically heating his work.

Write for circular and particulars.

NEW ERA ELECTRIC CO.
942 W. Lake St. CHICAGO.

Little Giant Axle Box Press



For putting in and taking out axle boxes by screw pressure. Boxes can be set much tighter with this machine than by driving. Write for further particulars and prices.

No danger of breaking or bruising them. They can be forced out in the same way. The machine only weighs 65 pounds. We also manufacture power and hand punching and shearing machinery.

Heartley Mach., Variety & Iron Tool Wks,
906 Summit St., Toledo, O.

Little Giant.

IT'S A PLEASURE



to work with Little Giant tools with their keen cutting edges. We make screw plates, taps, and dies that excel all other brands in quality, durability and accuracy.

Why don't you write for our Catalogue showing all styles of Little Giant tools? We will gladly send one to you free.

WELLS BROS. CO.
GREENFIELD, MASS.

New York Store, 56 Reade St. London Store 149 Queen Victoria St.

Little Giant.

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30 DAYS ON THIS "Woodpecker"



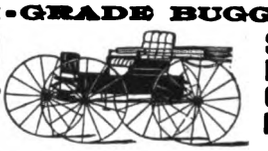
AN ENGINE THAT WORKS

An ideal power for the shop man. Perfectly simple and never any trouble to make it run. Try till you know. Ship it back if you have any kick; no harm, no expense. Uses alcohol or gasoline. 3½, 7, 14 h.p. A selling plan that's fair and square. Write and let us tell you.

WOODPECKER 4th St Office, Middletown, Ohio.

HIGH-GRADE BUGGIES

$47.50 AND UP.



Strictly First-Class Material.

Dealers Only.

JAMES & MEYER BUGGY CO.
Write for Catalog and Prices. Lawrenceburg, Ind.

MARVEL COMBINED SHEAR & PUNCH

Made of Malleable Iron



CUTS ½ in. x 2 in. flat, and ¼ in. to ¾ in. round.

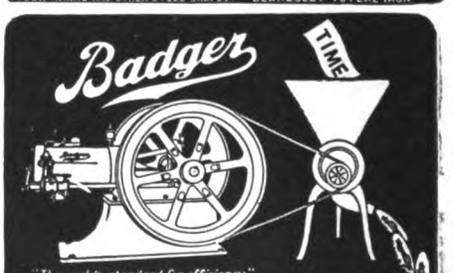
PUNCHES ⅝ in. hole in ⅜ in., and ½ in. hole in ½ in. stock.

Write for circular and price

Also other Marvel Shears, Punches and Rod Cutters

ARMSTRONG-BLUM MFG. CO.
107 N. Francisco Ave. CHICAGO, U. S. A.





BADGER GASOLINE ENGINES Turn Time Into Money

Badger Engines enable the blacksmith to make the most money out of his time by enabling him to do more, better and a greater variety of work, and at the same time employ less help—saving cost of helpers.

The **"Badger"** stands for superior excellence and efficiency the world over.

Badger Engines are easy to start and to keep going; cost almost nothing for repairs and last a life-time. They are as cheap as is consistent with best skilled workmanship.

Send at once for our **Fine Book, Illustrated in colors**—It's FREE. It tells all about **Badger** Gasoline Engines, and why they are the best on earth for the Blacksmith. Write today, before the books are gone.

Special discount to Blacksmiths who take an agency.

Write for attractive terms.

C. P. & J. LAUSON,
103 W. Water St., Milwaukee, Wis.

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BUFFALO NO. 660 PORTABLE DOWN DRAFT FORGE

NOTHING TO WEAR OUT **THE FUEL SAVER** **NO SMOKE**

GUARANTEED FOR FIVE YEARS

Any parts of Buffalo No. 200 Blower attached to this Forge, wearing out in five years, will be replaced free of charge. This Blower is positively guaranteed to produce a stronger, more powerful blast than any other blower in the world.

FIGURES DON'T LIE!

Average Yearly Cost for Fuel, Old Style Forge, - -	$55.00
Average Yearly Cost for Fuel, Buffalo No. 660 Forge, - -	36.67
YOU SAVE, PER FIRE, EACH YEAR, -	18.33

— HOW IT WORKS —

On turning the crank of the powerful No. 200 Buffalo Hand Blower, all smoke and gases are drawn into the stack by means of the draft produced by a connection to fan case. The larger part escapes up the stack by reason of the natural and induced draft, while a portion passes through the fan into tuyere. A separate connection from blast pipe into stack strengthens the natural draft and is of great service when fire is started.



BUFFALO NO. 660 PORTABLE DOWN DRAFT FORGE—CAST IRON HEARTH.

Cast iron hood. No rusting out. Tile stack indestructible from heat, rust and gases.

SOLD BY BEST DEALERS THROUGHOUT ENTIRE WORLD

Send for our complete Catalog, showing 250 styles and sizes.

"A FORGE FOR EVERY TRADE."

Have one placed in your shop on 30 day's free trial, If you buy before July 1st, we will send you check for 10 per cent rebate of the price.

ALL SMOKE, GASES, FUMES AND CINDERS ABSOLUTELY DONE AWAY WITH. NO SMOKY SHOPS.

In setting up, use one length of tile in the smoke pipe and the outfit will last a lifetime with no repairs.

BUFFALO FORGE COMPANY

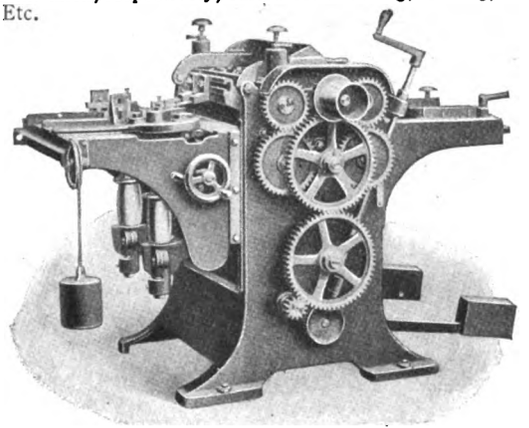
BUFFALO, N. Y., U. S. A.

THE CANADIAN BUFFALO FORGE COMPANY, LTD., MONTREAL, CANADA

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Our Nos. 17 and 18 Royal Standard Planer, Matcher and Moulders

are general purpose machines for working material most profitably and with the greatest economy. These machines plane up to 24 and 26 in. wide, 7 in. thick, and match up to 12 and 14 in. wide and 2 in. thick, respectively, suited for Flooring, Ceiling, Moulding, Etc.



They are built on lines guaranteed to save you time, labor and trouble, insuring large output and best work. Have four-sided double beltcd cylinders, improved expansion gearing, special moulding features, etc.

We make only high-grade, Wood-Working Machinery — Not the Cheapest but the BEST.

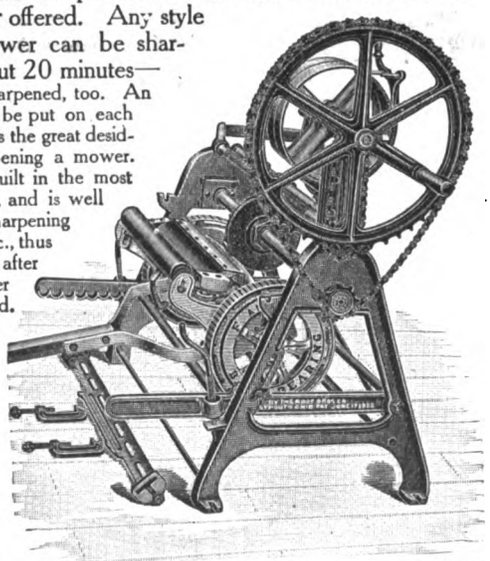
Large circular and particulars sent on request.

The Cordesman-Rechtin Co.

Cincinnati, Ohio.

THE IDEAL LAWN-MOWER GRINDER 1907 PATTERN

is now on the market and as an adjunct to the Blacksmith Shop or Repair Shop will be found one of the most useful machines ever offered. Any style of Lawn Mower can be sharpened in about 20 minutes—and perfectly sharpened, too. An exact bevel will be put on each blade, and this is the great desideratum in sharpening a mower. The Ideal is built in the most durable manner, and is well adapted for sharpening tools, skates, etc., thus being of service after the lawn-mower season has ended.



It is a money-maker from the beginning. You cannot afford NOT to have an Ideal Grinder and we can prove it.

WRITE FOR PARTICULARS.

ROOT BROS. CO., PLYMOUTH, O.

WEBER ENGINES

THE POWER

FOR

Blacksmiths Wheelwrights Woodworkers

THOUSANDS IN USE

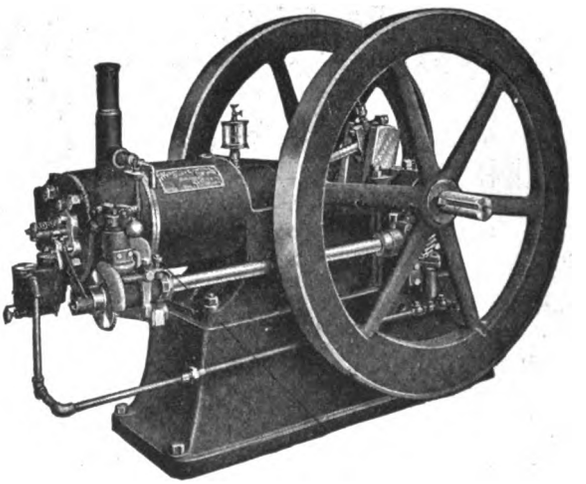
"I have been using a Weber Gasoline Engine in my shop which is running a 26-inch planer, Band Saw, Rip Saw, Cut-off Saw, and other machinery. It starts just as easy in cold weather as in warm. The engine is giving excellent service."
P. H. ROUTZAHN, Garfield, Wash.

"I have been using a Weber Engine for over two years and it is giving perfect satisfaction. My expense for repairs will not exceed 10 cents. The engine gives me plenty of power."
J. H. KRUSE, Gladbrook, Iowa.

"I have been using my 6 H. P. Weber Engine for over two years. It is the simplest engine to operate I have ever seen. There are ten gasoline engines in our town, mostly Webers. My brother has just completed a shop which will be operated by a 6 H. P. Weber engine.
STAPP BROS. & CLARK, Comanche, Texas

"The 6 H. P. Weber Engine which is running my shop machinery is one of the best pullers that I have ever worked with, and I have worked on ten different makes. The engine is simple, and a 6 or 8 years old boy can operate it without any trouble."
GEORGE KAMMRICH, Tipton, Missouri.

"I have been using a 6 H. P. Weber Engine for over 2 years, which has given me entire satisfaction. It is simple to operate and gives no trouble of any kind. I am running a Band Saw, 16-inch planer, Jointer, Shaper, Drills and other machinery, and it gives all the power I want." JOHN BORMUTH, Providence, Ky.



Sizes 3 H. P. to 350 H. P.

FUELS

GASOLINE — GAS — ALCOHOL

Ask for Catalog and Prices.

Weber Gas Engine Company

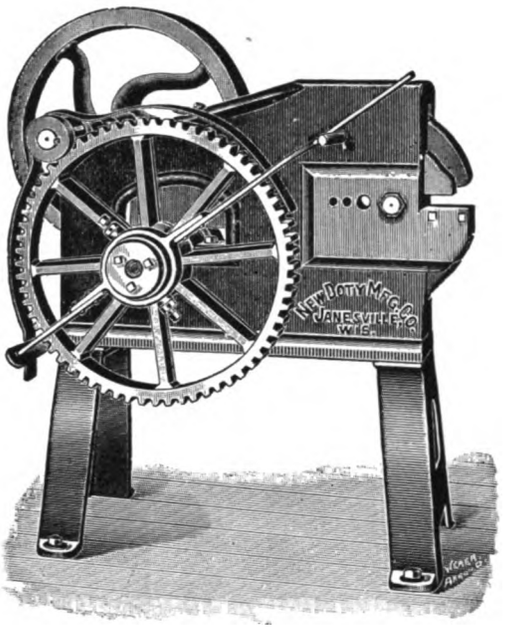
Box 400, Kansas City, Mo.

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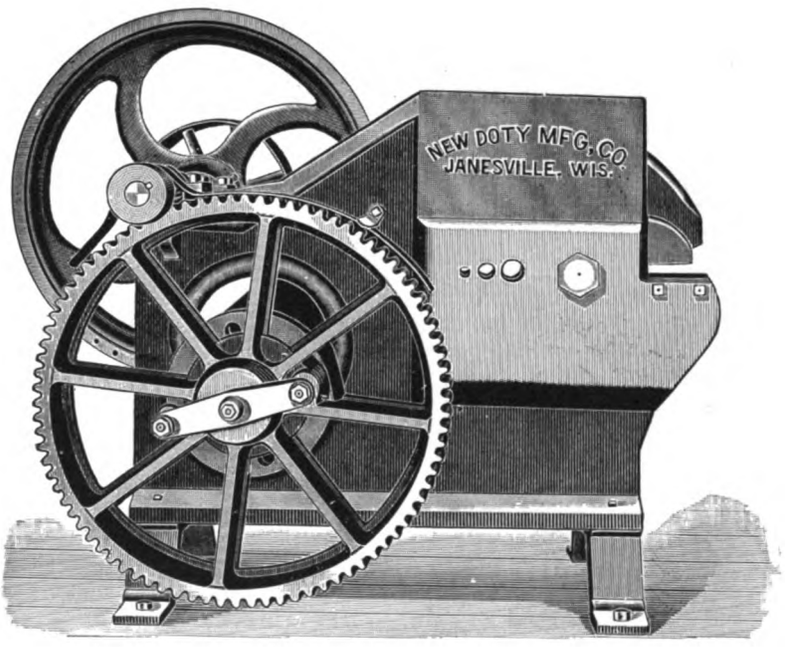
New Doty Punches and Shears

No. 7 Series Alligator Shears

MADE IN
SIX SIZES



THESE machines are very strong and powerful. The knives for flat and round iron are independent of each other, and are always ready for use. The round iron knives are made the reverse of the iron and so do not flatten it in cutting.



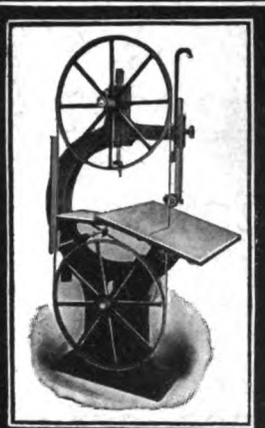
THE eccentric is of such a shape that there is a slight pause after each stroke to allow the operator to adjust the metal for the next stroke.

---Manufactured by---

THE NEW DOTY MFG. CO.

JANESVILLE, WIS.

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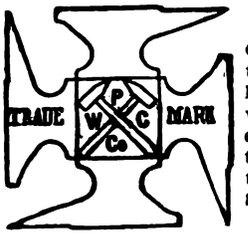
Chicago Woodworking Machinery Company
CHICAGO, ILL.

SHAPERS
SANDERS
JOINTERS
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PONY PLANERS
CABINET PLANERS

WRITE FOR PRICES AND INFORMATION ON ALL KINDS of Woodworking Machinery

YOU WILL NEVER FAIL
To Make a Strong, Clean Weld If You Use Perfection Welding Compound.

We invite you to give our Compound a thorough test, and will ship any amount to any address for that purpose. If it does not prove just as represented we pay all expenses.

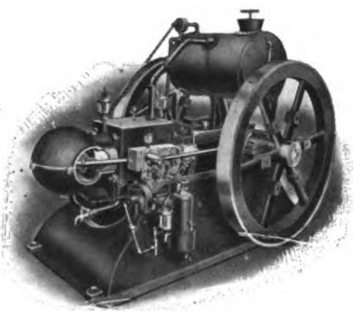


Perfection Welding Compound will do the trick quickly and neatly. It makes a stronger weld than any other compound manufactured, as proven by the tests it has undergone. Send for free sample.

PRICE CONSISTENT WITH QUALITY.
PERFECTION WELDING COMPOUND CO., SCRANTON, PA.

"The tire upsetter I received from you is just the kind the Blacksmith wants. I have tested mine with a four inch tire one inch thick, and it did the work, and I believe it is the best machine made. Always buy the No. 3 Buffalo tire upsetter and you need no other.
JOSEPH MARTIN, Connellsville, Pa."

LIGHTNING GASOLINE ENGINES

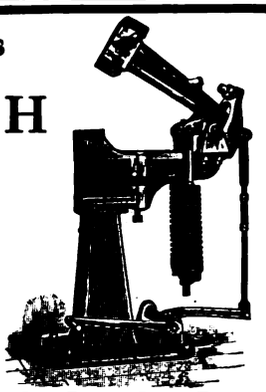


Steam Cooled
Double Piston
No Foundation

Send for Catalogue Showing Superior Points, and get Prices

KANSAS CITY HAY PRESS CO. 482 Mill St., Kansas City, Mo.

Lighten Your Labors
BY USING A
STANDISH
FOOT-POWER
HAMMER



Takes the place of a helper. You can do more work and better work. Our Power Hammers give perfect satisfaction wherever used and they are doing good work in the best shops in the country. Drop us a card and we will send you INTERESTING DESCRIPTIVE CIRCULARS FREE.
WRITE AT ONCE—TODAY.
The Standish Machine & Supply Co.,
COLUMBUS, OHIO

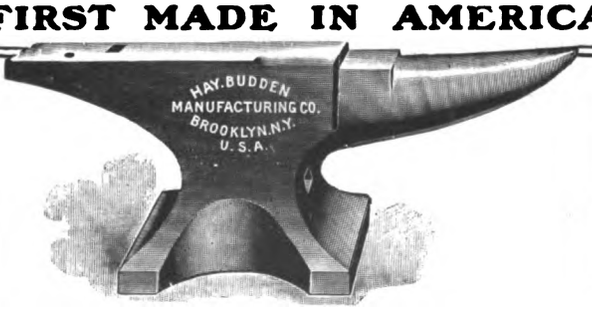


THE SCIENTIFIC HYDRAULIC TIRE SETTER
IS WHAT YOU WANT.
WRITE TO
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HAY-BUDDEN SOLID WROUGHT ANVILS
FIRST MADE IN AMERICA

The Gold Medal Anvil
HIGHEST AWARD
OMAHA, 1898 PAN-AMERICAN, 1901

Every Genuine "Hay-Budden" Anvil is made of the best **American Wrought Iron** and faced with the best **Crucible Cast Steel.** Every genuine "Hay-Budden" Anvil is made by the latest improved methods.



Over 100,000 in Use
WARRANTED
WEIGHTS FROM 10 to 800 LBS.

Experience has proved their worth and demonstrated that "HAY-BUDDEN" Anvils are Superior in Quality, Form and Finish to any others on the Market.

HAY-BUDDEN MFG. CO., BROOKLYN, N. Y.

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VOLUME 6

THE AMERICAN BLACKSMITH

NUMBER 9

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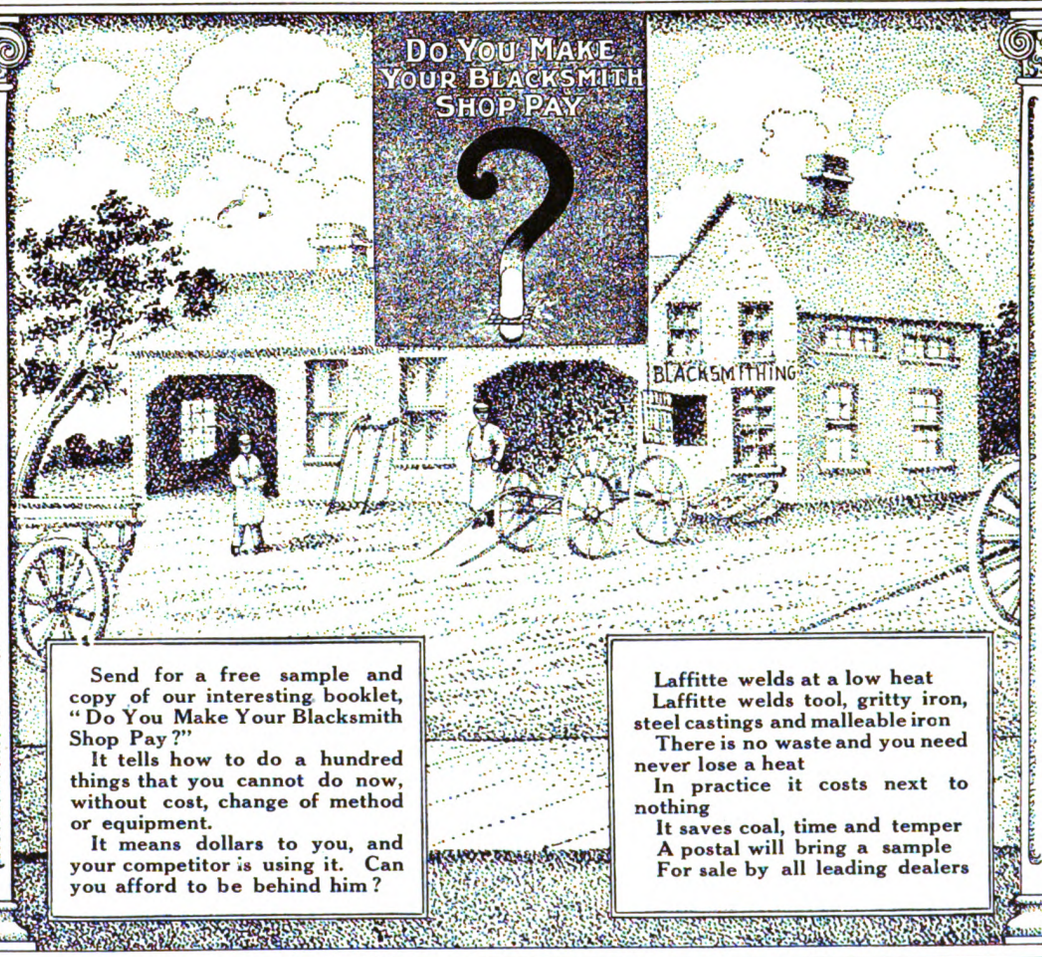
A Practical Journal of Blacksmithing and Wagonmaking

BUFFALO
N.Y. U.S.A.

JUNE, 1907

$1.00 A YEAR
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LAFFITTE
WELDING PLATES



Send for a free sample and copy of our interesting booklet, "Do You Make Your Blacksmith Shop Pay?"
It tells how to do a hundred things that you cannot do now, without cost, change of method or equipment.
It means dollars to you, and your competitor is using it. Can you afford to be behind him?

Laffitte welds at a low heat
Laffitte welds tool, gritty iron, steel castings and malleable iron
There is no waste and you need never lose a heat
In practice it costs next to nothing
It saves coal, time and temper
A postal will bring a sample
For sale by all leading dealers

THE PHILLIPS-LAFFITTE CO
PENNSYLVANIA BLDG. PHILADELPHIA, PA.

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How About YOU?

IS "working for your health" so pleasant that you don't care whether your shop pays a profit or not?

Are you still using the old antiquated methods in preference to the newest labor-saving tools?

Would you really object to a few extra dollars floating your way every week in the shape of increased profits? Could you use that extra money for anything?

Now we frankly admit that we don't know it all—we only know how to make the best tools.

When you're thinking how to increase your profits, when you're worrying over how to cut down expenses, when you're fretting about your wasted time and material—just pick up a post card and ask us for our new 1907 Machinery Catalog?

That's what we printed them for.

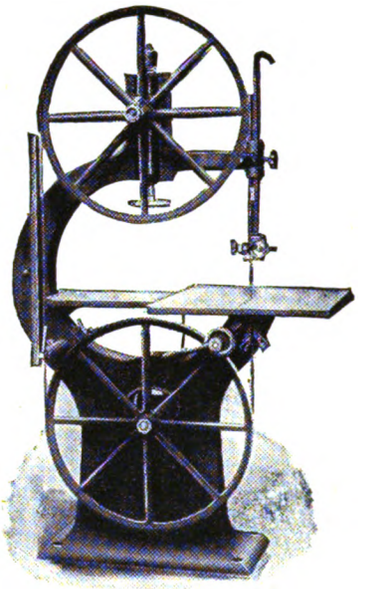
Silver Manfg. Co.

365 Broadway,

Salem, Ohio, U. S. A.

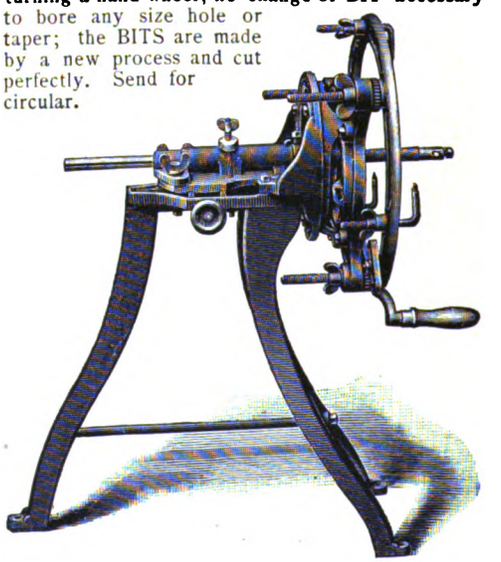
Improved Band Saws

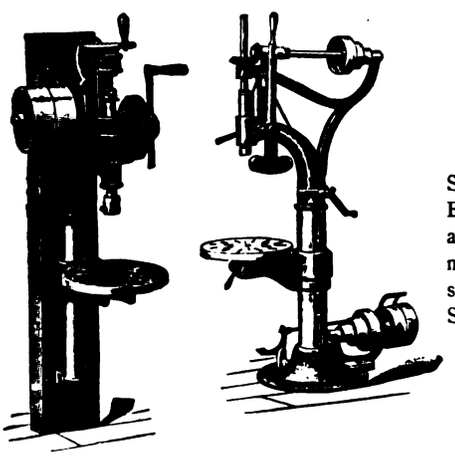
Foot and belt power. New patterns throughout—rigid, symmetrical construction, new table tilting device, perfectly balanced wheels. Belt shifter, adjustment of upper wheel, saw guide, tension of saw blade, etc., all within easy reach of the operator. Sizes, 20 to 36 inches.



Taylor's New Taper Hub-Boring Machine.

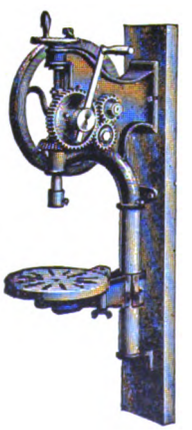
Special Features—Cut of BIT regulated simply by turning a hand wheel; no change of BIT necessary to bore any size hole or taper; the BITS are made by a new process and cut perfectly. Send for circular.





Drills

Swing, Post and Bench Drills for hand and power. Automatic feeding, new simple and efficient. Strong and durable.



Portable Forges

We make 14 kinds of Portable Forges. We have a size to suit your needs. Strong and durable. Attractive designs.

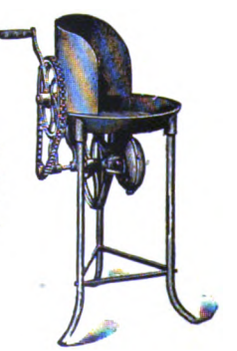


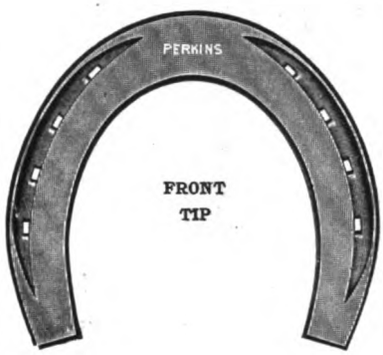
Fig. 901, with Shield.

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HIND
LONG HEEL.

Look for this Trade Mark ★ The Star brand beats all others



FRONT
TIP



FRONT
LIGHT.



FRONT
TOE WEIGHT.

★PERKINS★
HORSE SHOES
AND
TOE CALKS
The **SUPERIOR** Kind

Have more points of superiority than any other make. An up-to-date shoe for up-to-date Blacksmiths.



HIND
SIDE WEIGHT.

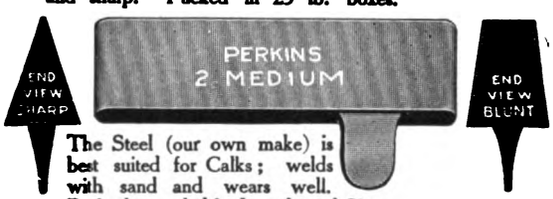
Perkins Shoes have given satisfaction wherever used. Our line is complete and every shoe guaranteed. Made in all styles and sizes. Send for sample. New Pattern Front Extra Light and Light. Free for the asking. We will gladly send

COMPLETE CATALOGUE AND SAMPLES FREE.

WRITE TODAY.

PERKINS

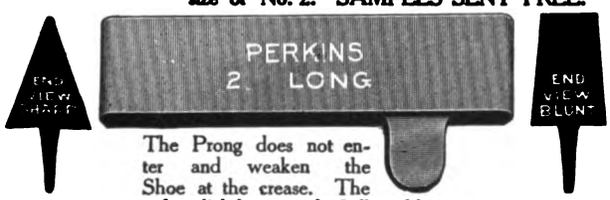
Made in Medium and Long, both blunt and sharp. Packed in 25 lb. boxes.



The Steel (our own make) is best suited for Calks; welds with sand and wears well. Perfectly graded in Length and Size.

TOE CALKS

Chisel Pointed Prong. These cuts show exact size of No. 2. SAMPLES SENT FREE.



The Prong does not enter and weaken the Shoe at the crease. The only slightly curved Calk sold.

MANUFACTURED BY

RHODE ISLAND PERKINS HORSE SHOE COMPANY

PROVIDENCE, RHODE ISLAND.

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Shoers who use

Morgan & Wright Pads

are mighty glad of it these prosperous pad days.

Most any shoer can testify to the fact that the pad business is getting bigger every day. Team owners are fast finding out that it pays, and pays BIG, to protect the horses' hoofs with pads, and shoers who are using GOOD pads, are, as a result, building up a permanent and prosperous business.

Morgan & Wright Pads have become very popular among shoers, because they actually care for horses' hoofs as they SHOULD be cared for, and are satisfactory to the horse owners so far as durableness is concerned.

Besides, they are easier to fit and run larger than any other brands and hence are better money-makers.

Get your share of this good pad business by using GOOD pads.

A pad for every purpose—17 in all.

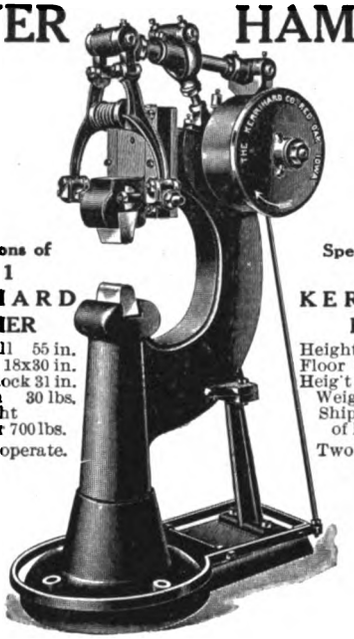
Any jobber can supply you.

MORGAN & WRIGHT, CHICAGO

BRANCHES

New York, 214 W. 47th St, Boston, Motor Mart
Cleveland, 1829 Euclid Ave. Dayton, 416 E. 5th St.
Minneapolis, 708 Hennepin Ave. St. Louis, 538 N. Vandeventer Ave.
Atlanta, 49 Forsythe St. Chicago, 15-17 N. May St.
San Francisco, 423-433 Golden Gate Ave.

THE LEADER
OF THEM ALL
KERRIHARD'S
POWER HAMMER



Specifications of NO. 1 KERRIHARD HAMMER

Height over all 55 in.
Floor space 18x30 in.
Heig't anvil block 31 in.
Weight of ram 30 lbs.
Shipping weight of hammer 700 lbs.
One H. P. to operate.

Specifications of NO. 2 KERRIHARD HAMMER

Height over all 60 in.
Floor space 20½x40 in.
Heig't anvil block 31 in,
Weight of ram 75 lbs.
Shipping weight of hammer 1250 lbs.
Two H. P. to operate

A first-class machine sold at a low price. Contains every modern feature. Strongly built of the best material. Will do your work easily and quickly and will do it right.
MADE IN TWO SIZES.

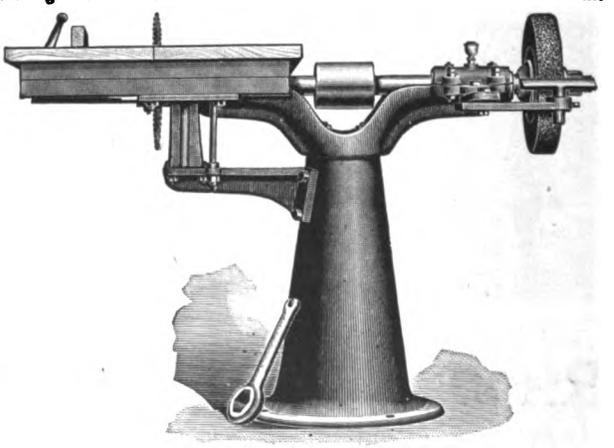
WRITE FOR FREE BOOKLET AND PRICES.

THE KERRIHARD CO.,
HAMMER AND GRINDER DEP'T,
RED OAK, IOWA, U. S. A.

CANADIAN INQUIRIES AND SHIPMENTS.
BURRIDGE-COOPER CO., LTD.,
Winnipeg, Manitoba.

THE KERRIHARD GRINDER
Fitted with Sawing Table and Frame.

Has all the features of the more expensive and elaborate saw tables. Table and frames can be removed instantly and grinding wheel put on for grinding. Will take wheels to 20 in. diam. and buzz saws 16 in. diam.



Pocket Souvenir mailed free on request.

Write for Illustrated Booklet and Prices.

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This is the Shoe That Did the Work



Yes, I smile. Why not? You should see my horse travel since I have the Humane Cushion Heel Shoes on him. He travels like a two-year-old and is restored to his former action and usefulness. A trial will convince the most skeptical, as it is a practical and durable shoe.

A gratified horse owner, JOHN WISE.

All Good Features Combined in One Shoe.

THE only shoe that has a cushion tread, that can be heated for welding on the desired toe calk and for shaping to fit the hoof.

It leaves the bottom of the hoof uncovered, same as the common shoe, and the rubber does not come in contact with the hoof or the ground.

It is constructed in such a way that it has as much cushion when practically worn out that it has when first put on.

These features are found in no other shoe and the most critical can find no fault.

Send in your order at once to

The Humane Horse Shoe Company, Lima, O.

I. H. C. GASOLINE ENGINES

Powers developed along correct mechanical lines and admirably adapted to mechanics and shopmen's uses. A responsible maker guarantees their reliability. Verticals in 2 and 3 Horse Power. Horizontals (portable and stationary) in 4, 6, 8, 10, 12, 15 and 20 Horse Power. Catalogs and particulars from I. H. C. local agents or write the home office.

INTERNATIONAL HARVESTER CO. OF AMERICA, (Inc.)
7 U Monroe St., CHICAGO, ILL., U. S. A.

LIGHTEN YOUR LABORS

BY USING A

STANDISH FOOT-POWER HAMMER.

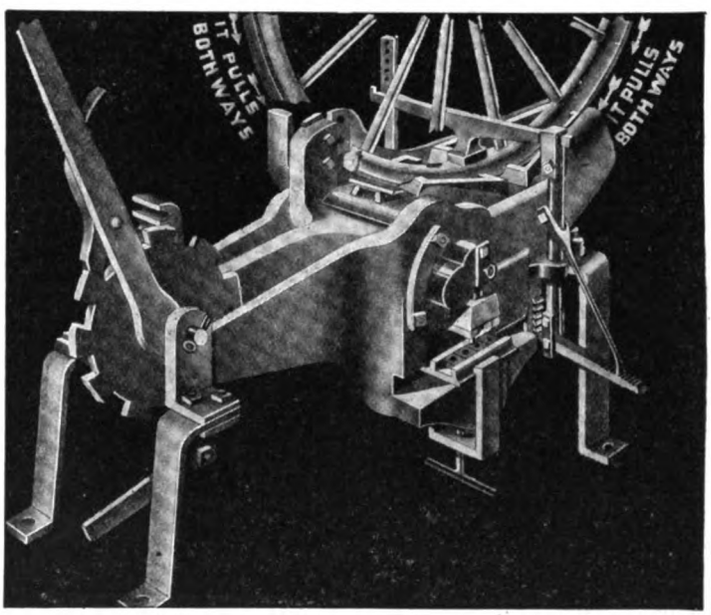
Takes the place of a helper. You can do more work and better work.



Our Power Hammers give perfect satisfaction wherever used and they are doing good work in the best shops in the country. Drop us a card and we will send you **interesting descriptive circulars free. Write at once—today.**

The Standish Machine & Supply Co.,
COLUMBUS, O.

THE HOUSE COLD TIRE SETTER



This is a Cut of Our No. 1 Machine, whieh sets all size tires up to 2 by ¾ inches and shears ⅝ by 3 flat iron and ⅞ round, and punches holes up to ½ inch, and does it almost as fast as you can count. Can be changed from one size hole to the other in two seconds.

We are selling thousands of them and they should be and would be in every wagon shop if the smith could only understand of what real value they are. Think of it, they actually set a tire better than it can be done in the old way, and do it in five minutes instead of fifty minutes.

2nd. Remember, we give you the best shear and punch in the World comparatively free, and besides that, we sell our machines for less than any other cold tire setter is offered, and we sell them on easy terms.

3rd. Eight hundred smiths in our native state, Texas, have bought them and they are still buying. We sold them there first, they have tried them well and know what they are.

4th. They cannot be broken nor worn out.

5th. Uncle Sam has seen the truth of the above and has adopted them.

6th. Our competitors seem to think that if they can get their machine in your shop that they can persuade you some way to keep it, but it is no use. For just think of a tire setter made with its heads to move on a straight line instead of moving with the curve of the wheel. They might set tires on square wheels if there were any; but how can they set tires on round wheels without injuring the wheel.

7th. Now in consideration of the above, why not send us your order? What can you be afraid of?

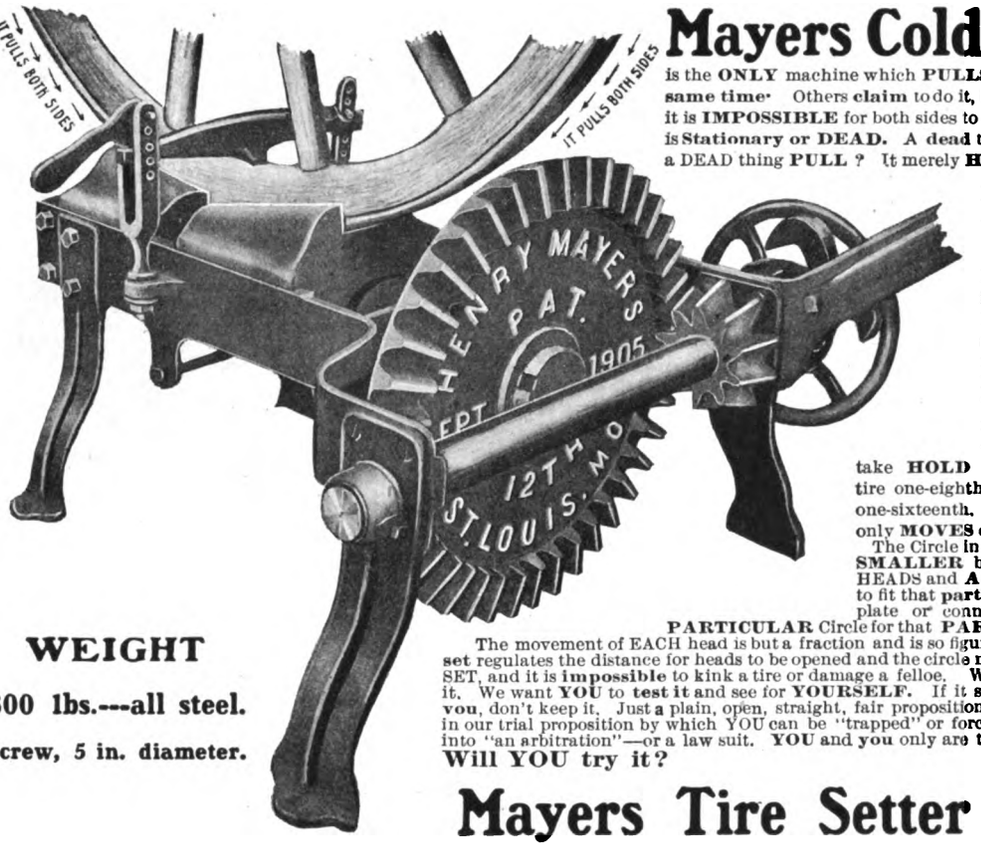
Our No. 2 and No. 3 machines have both hand and power attachments. The No. 2 sets all tires up to 3¼, and the No. 3 sets all ordinary tires up to ⅞ by 4½ inches, and shears 1¼ by 5 flat iron, 1¾ round, and cuts off axles up to 1½ square, and will punch all size holes up to ⅝.

OFFICE AND FACTORY,

HOUSE COLD TIRE SETTER CO.

216-220 So. Third St., ST. LOUIS, MO., U. S. A.
J.F. House, No. 40 Church St., Toronto, Ontario, Can.

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Mayers Cold Tire Setter

is the **ONLY** machine which **PULLS BOTH** sides of the tire **at the same time**. Others **claim** to do it, but any sensible man can see that it is **IMPOSSIBLE** for both sides to **pull or MOVE** when **ONE** side is **Stationary or DEAD.** A **dead** thing **stays still.** Did you ever see a DEAD thing **PULL** ? It merely **HOLDS** and the moving side **pulls.** Is this not common sense? It is the **TRUTH** and the **Whole** truth.

ANOTHER THING: Each head in this machine moves and it moves on a **straight line** in a Machine fit in the frame so it's absolutely true as a die, no **wabble,** no "kinks" sideways, **Each** head **PULLS.** But figure how **LITTLE** each HEAD **moves.** There is no **lost motion** like that in other machines. The Grip keys take **HOLD instantly.** To up-set a buggy tire one-eighth inch, each head only **MOVES** one-sixteenth. To upset one-fourth, each **head** only **MOVES** one-eighth, etc.

The Circle in the heads is made **LARGER** or **SMALLER** by **opening** or **closing** up the HEADS and **AUTOMATICALLY** adjuts itself to fit that **particular** size wheel, as the bridge plate or connecting piece COMPLETES that **PARTICULAR** Circle for that **PARTICULAR** wheel.

The movement of EACH head is but a fraction and is so figured that the space required for a **set** regulates the distance for heads to be opened and the circle **made complete for that particular** SET, and it is **impossible** to kink a tire or damage a felloe. We not only **say it** but **guarantee** it. We want **YOU** to **test it** and see for **YOURSELF.** If it **suits YOU,** keep it. If it don't suit **you,** don't keep it. Just a plain, open, straight, fair proposition. There is no clause or "catch" in our trial proposition by which YOU can be "trapped" or forced into keeping the machine or into "an arbitration"—or a law suit. **YOU** and **you** only are to be the SOLE Judge and Jury. **Will YOU try it?**

WEIGHT

800 lbs.---all steel.

Screw, 5 in. diameter.

Mayers Tire Setter M'f'g Co.

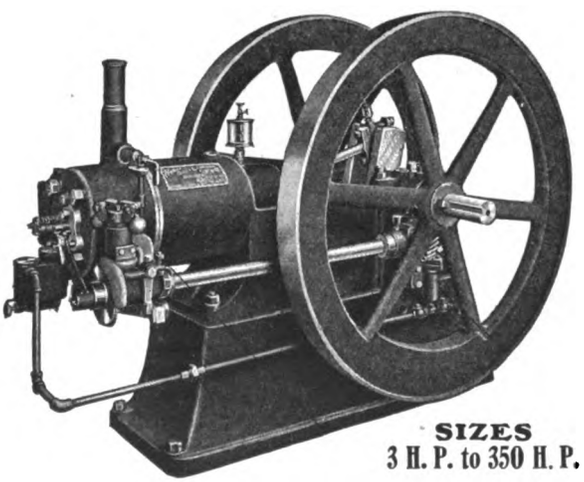
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WEBER GAS GASOLINE ALCOHOL ENGINES

THE POWER FOR YOUR SHOP

INCREASE YOUR OUTPUT!
DOUBLE YOUR PROFIT!

ENID, Oklahoma,
Weber Gas Engine Co,
Gentlemen;—
I am using a 6 H, P, Weber Engine and will say it is all you claim it to be. It works fine and gives steady power. I would not want an engine to start easier, and it is also economical in the use of gasoline. The fact is, I would not be without it as my power is always ready. Every up-to-date Blacksmith and Wagon Maker should have one of these engines. It is astonishing how simple they are and how easy to run.
Yours truly
WM. HACKETT.



SHAWNEE, Ks.
Weber Gas Engine Co.
Gentlemen:
I will say that in my experience I have found the Weber to be the best engine made. The reason why I bought the "Weber" is because it is the simplest one to keep in order.
My engine runs Grindstone, Emery Wheel, Turning Lathe, Rip Saw, Cut-Off Saw and Drill Press.
I purchased my engine about the 23rd of May, 1904, and it is as good as new today. I use it every day and I will buy another Weber when this one is worn out.
Yours truly,
J. C. KEENAN.

SIZES
3 H. P. to 350 H. P.

HIGHEST AWARD
ESTABLISHED 1864 PRODUCER
WEBER GAS GASOLINE ENGINES AND HOISTS
GOLD MEDAL

Write for descriptive catalog, stating the H. P. you want.

Weber Gas Engine Co., P. O. Box 400. Kansas City, Mo.

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Buffalo 200 and 306 Blowers

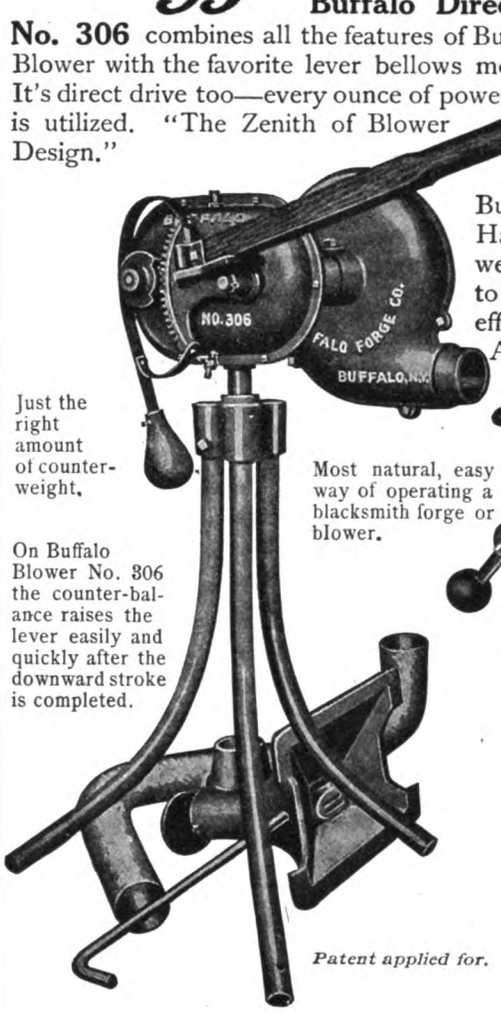
Buffalo Direct Drive Blower

No. 306 combines all the features of Buffalo No. 200 Blower with the favorite lever bellows motion. It's direct drive too—every ounce of power is utilized. "The Zenith of Blower Design."

GUARANTEED FOR FIVE YEARS

GUARANTEED FOR FIVE YEARS

Buffalo Nos. 200 and 306 Geared Hand Blowers are guaranteed to outwear any others on the market and to produce a stronger blast with less effort than any other blower built. Any parts wearing out in five years will be replaced free of charge and no questions asked.



Just the right amount of counter-weight.

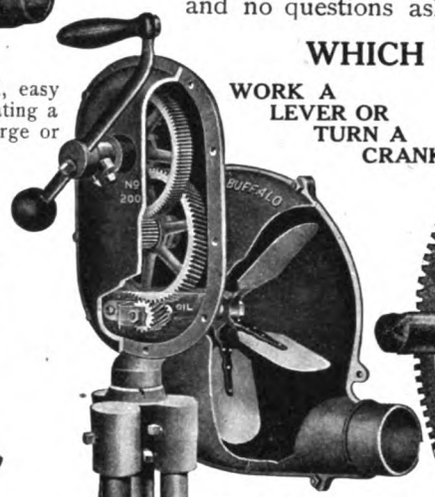
On Buffalo Blower No. 306 the counter-balance raises the lever easily and quickly after the downward stroke is completed.

Patent applied for.

Buffalo Direct Drive Blower No. 306 with new H. H. Tuyere.

Most natural, easy way of operating a blacksmith forge or blower.

WHICH ? WORK A LEVER OR TURN A CRANK?

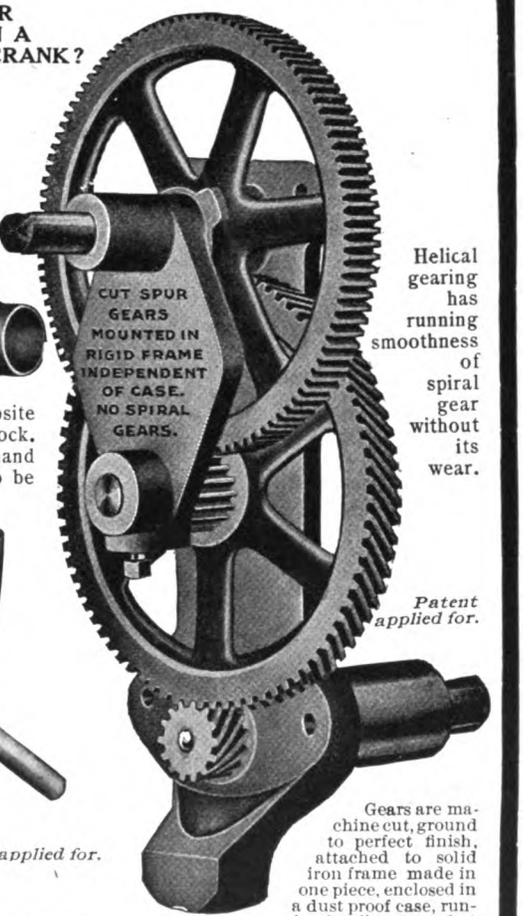


Crank turns opposite to hands of a clock. Cut shows right hand blower—can also be built left hand.

Patent applied for.

GEARING.

No Spiral Gears to wear out.



Helical gearing has running smoothness of spiral gear without its wear.

Patent applied for.

Gears are machine cut, ground to perfect finish, attached to solid iron frame made in one piece, enclosed in a dust proof case, running in oil. A perfect self-oiling machine.

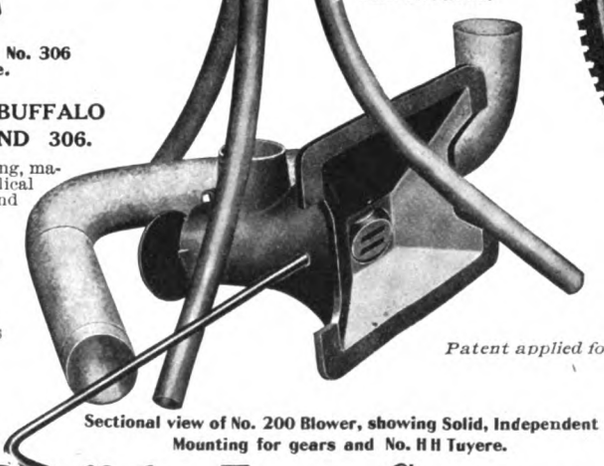
TELLING POINTS OF BUFFALO BLOWERS NOS. 200 AND 306.

GEARS—Heavy, with large, strong, machine cut teeth, cut spur and helical variety, which reduces friction and increases efficiency.

BEARINGS—Bored from solid castings and reamed to gauge, ensuring perfect alignment and easy, silent running.

OILING—Gears constantly run in oil, keeping the working parts perfectly lubricated.

New 1907 Catalog sent on request.



Sectional view of No. 200 Blower, showing Solid, Independent Mounting for gears and No. H H Tuyere.

Sold by Best Dealers Throughout Entire World.

Buffalo Forge Company
Buffalo, N.Y.

Canadian Friends Buy of The Canadian Buffalo Forge Co., Ltd., Montreal, and Save Duty.

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Before an advertisement is accepted for this Journal, inquiry is made concerning the standing of the house signing it. Our readers are our friends and their interests will be protected. As a constant example of our good faith in **American Blacksmith** advertisers, we will make good to subscribers loss sustained from any who prove to be deliberate swindlers. We must be notified within a month of the transaction giving rise to the complaint. This does not mean that we will concern ourselves with the settlement of petty misunderstandings between subscribers and advertisers, nor will we be responsible for losses of honorable bankrupts.

The Cheer of The Man Who WINS



The man who wins a good position and a high salary is **entitled** to cheer.

He has accomplished something worth while. And yet it is really easy—yes it is easy for **YOU** to gain a better position, increased earnings, and a successful life. The experience of hundreds of thousands of men who have followed the I. C. S. road to success proves this unquestionably. No matter how poor your circumstances are, where you live, or what your condition of life, the I.C.S. can adapt its six-million-dollar system of salary-raising training to your own individual needs and help you to secure promotion. You, in your own home and in your spare time, can easily do this and can find out how by simply marking and mailing the coupon below. Will you let a postage stamp prevent your wining a better position?

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Please explain, without further obligation on my part, how I can secure a larger salary and advancement to the position before which I have marked X.

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Foreman Blacksmith	Architect
Foreman Machinist	Structural Engineer
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Mechanical Engineer	Civil Engineer
Machine Designer	Surveyor
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Electric-Lighting Supt.	U. S. Civil Service Exam.
Electric-Railway Supt.	Ad Writer

Name _____

St. & No. _____

City _____ State _____

THE MILTON MANUFACTURING CO.,

MILTON, PENN'A.

Manufacturers of **REFINED BAR IRON**

SUITABLE IN QUALITY FOR ALL PURPOSES.

We use Limit Gauges in rolling and guarantee our Bars uniform to size. We will gladly send you samples for test upon request. We are in position to make prompt shipment. We solicit your correspondence.

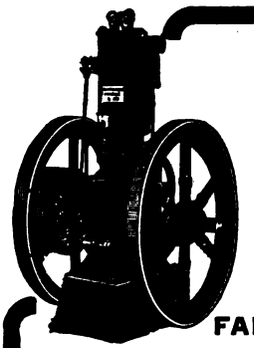
We also make Cold Punched and Hot Pressed Nuts.



REMY MAGNETOS

Will start and run your Gas or Gasoline Engine without the aid of batteries. Inexpensive and absolutely reliable for either make and break or jump spark ignition. Information sent on request.

Remy Electric Co., Anderson, Ind.



Look Ahead

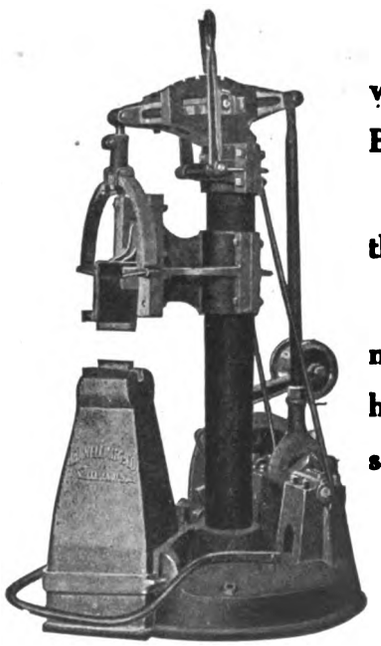
The far sighted blacksmiths are closing their 1907 contracts for

Fairbanks-Morse Gasoline Engines

Why not be an agent and install one in your shop where you can show it to the best advantage. They are so **Reliable** and so well known you can't help making money. Send for Proposition No. 487 A. P.

FAIRBANKS, MORSE & CO., CHICAGO, ILL.
12 DEY ST., NEW YORK.

Modern Power Hammer



The ONLY hammer on which you can get a LIGHT BLOW at FULL SPEED.

The shifting lever controls the length of stroke.

Set it in any one of the five notches and then handle the hammer with the treadle the same as any other.

Actually five hammers in one.

Write any jobber or the

THE GRINNELL MFG. CO.,

GRINNELL, IOWA.

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"QUICK ACTION"
IGNITING DYNAMOS
Excel all others!

The only generator that cannot lose its magnetism. For either make and break or jump spark work. Also spark coils. Send for Catalogue B.

The Knoblock-Heideman Mfg. Co.,
SOUTH BEND, IND.

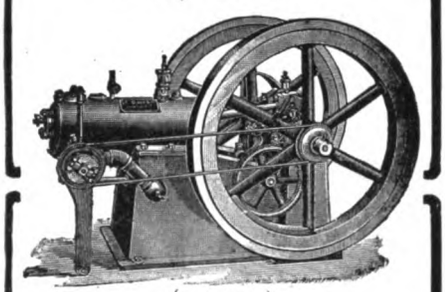
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Printers of THE AMERICAN BLACKSMITH, also Complete Equipment for the production of Machinery Catalogues, Stock Farm Catalogues, College Annuals and Catalogues in Foreign Languages, promptly, accurately and tastefully : : : : : : : : : : :

HAGEN
GAS AND GASOLINE ENGINES



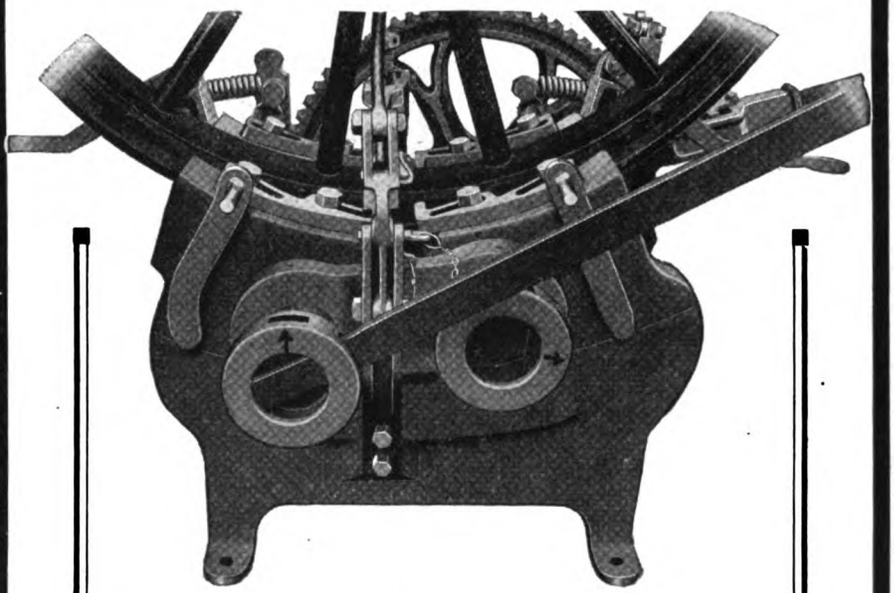
(2-25 H. P.)

ECONOMICAL and RELIABLE POWER FOR THE SHOP-RUNNING BLACKSMITH and WAGON MAKER.

HAGEN ENGINES are recommended on account of their simplicity, durability, comparatively low price, small cost of operating and the ease and certainty with which they can be controlled.

Our Catalogue explains all working parts. A postal will bring a copy to you. It's free. Write today.

HAGEN
GAS ENGINE AND MFG. CO.
Winchester, Ky., U. S. A.



THE BROOKS

has all the good features of other tire setters besides several special features of its own which our patents protect. This is the tire setter that will do your work quickly and do it properly, the tire setter that is most widely used and giving universal satisfaction; the only tire setter made with the necessary lateral or side movement of the draw heads, so that they line up with the tire and do not bend edgewise should one grip key get ahead of the other. Let us tell you all about this wonderful machine. Drop us a postal for more information. We make easy terms for payment.

Did you get one of the handy vest pocket memorandum books we are giving away? Write for one—free.

THE BROOKS TIRE MACHINE CO.
121 N. Water St. WICHITA, KANSAS.

Scott's IXL ALL High Speed Steel

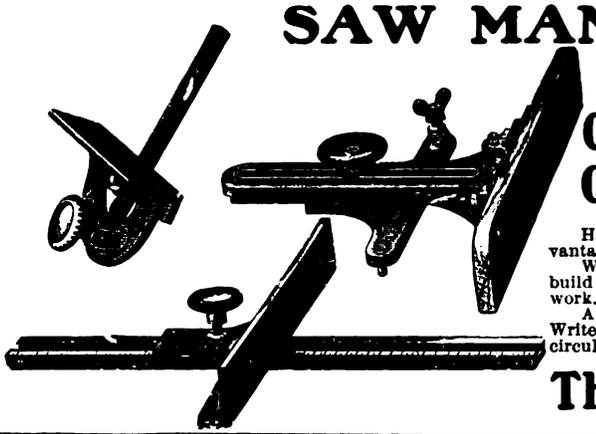
Will cut at least one speed faster than any other high speed steel on the market.

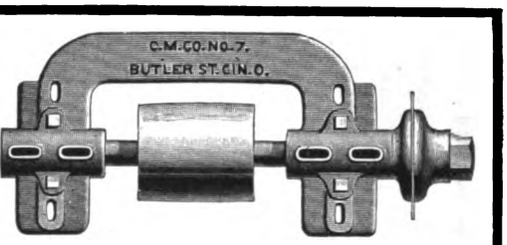
Write for Catalog covering entire line of SCOTT TOOL STEELS.

THE BOURNE-FULLER CO., Cleveland, O.

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SAW MANDRELS
RIP and CROSS-CUT GAUGES





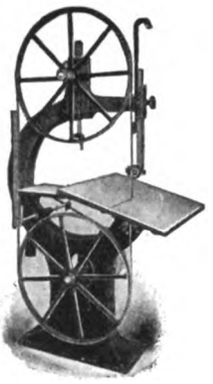
Have you many jobs on which you could use a rip or cross-cut saw and jointer to advantage?

We can furnish you with the necessary iron work at nominal expense and you can build your own machine. Or we can furnish you with complete machine suited for this work.

A small amount of money invested in this way will increase your profits wonderfully. Write us regarding your requirements. We will be pleased to supply such information and circulars as you might desire.

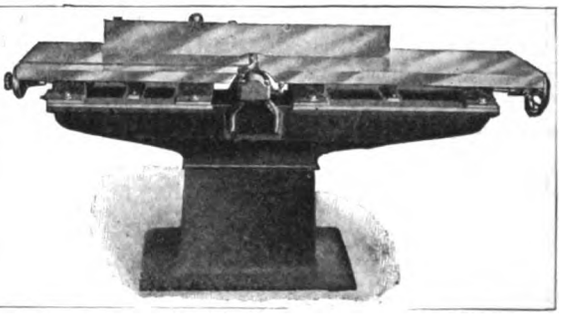
The Cordesman-Rechtin Co., Cincinnati, Ohio.

"DEFIANCE" Wood-Working Machinery



BAND SAWS
CUT-OFF SAWS
SWING SAWS
RIP SAWS
JOINTERS
LATHES

Write for Prices and Other Particulars



The Sidney Tool Company, Sidney, Ohio

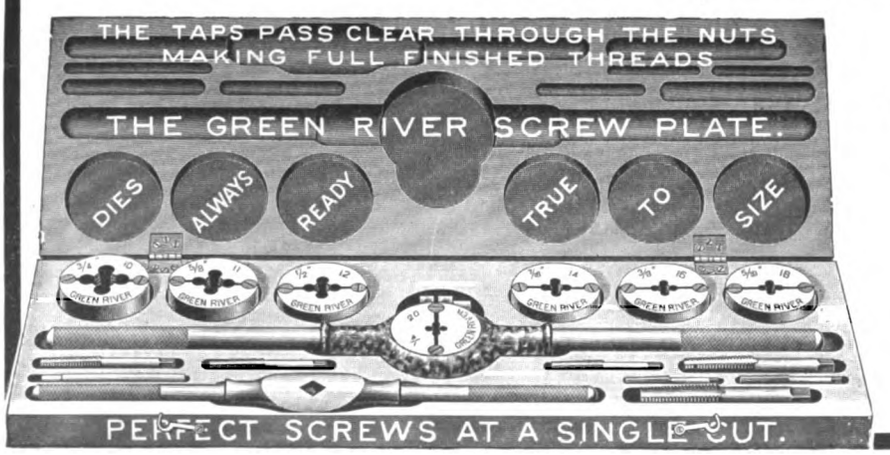
Green River Screw Plates

are found in almost every blacksmith shop.

WHY?

Because they are the best "Screw Plates" produced and when a blacksmith has purchased one of these substantial sets it lasts him a lifetime.

SEND FOR CATALOG 33 D.



Sole Makers.

Wiley & Russell Mfg. Co.,

GREENFIELD, MASS.

U. S. A.

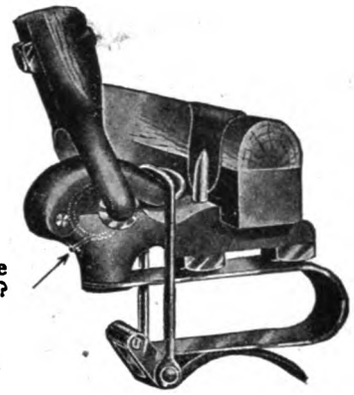
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ECCLES BALL-BEARING COUPLINGS

With Leather Bushings in one piece, securely fastened in the socket of the Coupling.

When the shafts are removed, the bushing does not come out, but stays in the Coupling where it belongs. NO LOST BUSHINGS WHEN YOU USE OUR COUPLINGS.

We would like to send you our circular and have you try our Couplings. They will save you money.



See the Clinch?

Pat. applied for

The Spring is pivoted at the front so that it can be turned forward out of the way of the wrench while clipping the Coupling to the axle.

These are two of the good points, but there are plenty more desirable features in our Couplings.

Patented Nov. 25, 1902.

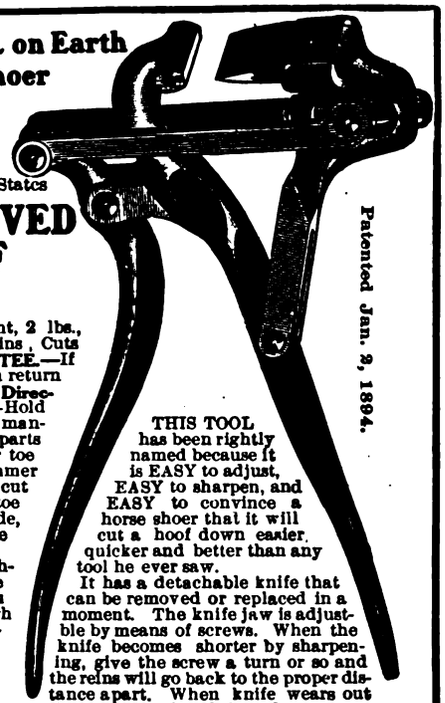
We also have a Catalog showing our full line of **Carriage and Wagon Forgings** all of which we make.

RICHARD ECCLES CO., Auburn, N. Y.

The BEST TOOL on Earth for a Horse Shoer

Price, Cash with Order, $1.75 Each

By Express Charges Paid to any point in United States



Patented Jan. 2, 1894.

THE IMPROVED EASY HOOF TRIMMER

DIMENSIONS.—Weight, 2 lbs., Length, 12 ins., Opens 2 ins., Cuts 1 in. **OUR GUARANTEE.**—If you don't like it you can return it and get your money. **Directions for Using.**—First—Hold the foot in the ordinary manner and remove soft parts from bottom with your toe knife; then with the trimmer begin at the heel and cut down and around the toe and back on the other side, removing the part at one cut and in one piece. Second.—Avoid all wrenching or prying. Hold the tool as near upright as you can. Cut straight through to the blank jaw regardless of nails or other obstructions, and with very little leveling with the knife or rasp your job is complete.

THIS TOOL has been rightly named because it is EASY to adjust, EASY to sharpen, and EASY to convince a horse shoer that it will cut a hoof down easier, quicker and better than any tool he ever saw. It has a detachable knife that can be removed or replaced in a moment. The knife jaw is adjustable by means of screws. When the knife becomes shorter by sharpening, give the screw a turn or so and the reins will go back to the proper distance apart. When knife wears out it can be replaced for a few pence.

CAUTION.—Don't make the mistake that a great many do by grinding bevel on one side of blade, but keep the bevel equal on both sides, so that it will pass through the hoof straight and not in a strain.

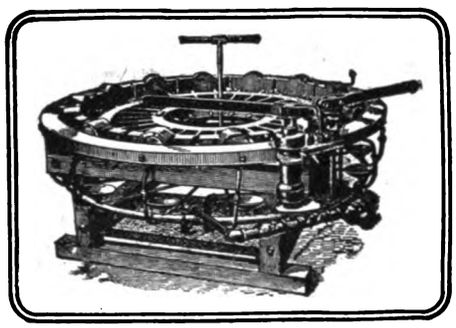
Follow above directions and you will soon learn to use THE BEST HOOF TRIMMER ON EARTH.

MADE BY

MUNCIE WHEEL & JOBBING CO., MUNCIE, IND.

Sole Wholesale Agents for the British Isles, **The Iron and Hardware Co., Ltd, Gloucester, England. C. Kloepfer, Guelph, Canada,** Agent for Dominion of Canada.

The West Hydraulic Tire Setter



Is a **Round Machine** for tiring **Round Wheels,** and compresses the tire at all points—not all in one spot—and the compression is so slight at any particular point that tire bolts do not have to be removed when resetting an old tire, neither are holes closed so bolts are tight in tire. Wheel is made compact and joints tight.

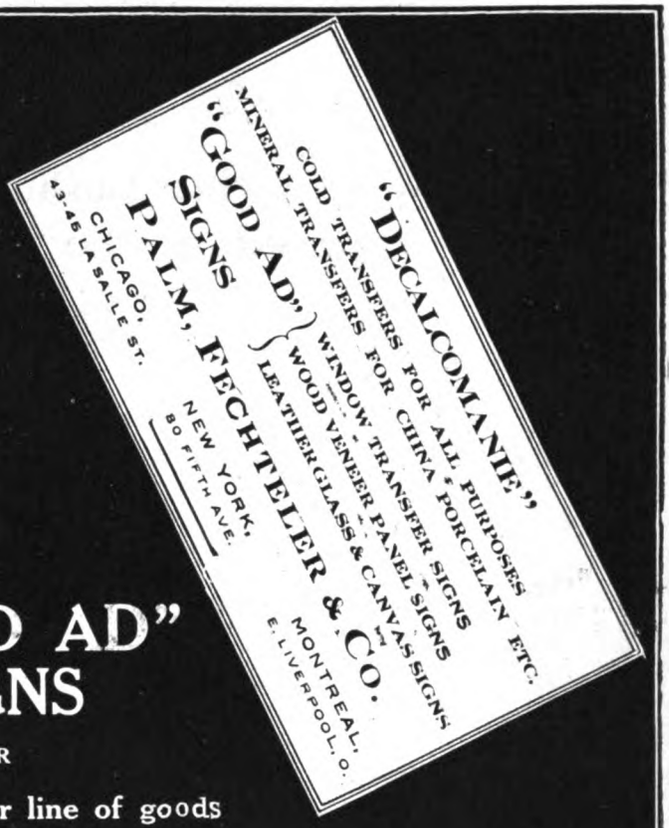
WRITE US YOUR REQUIREMENTS.

The West Tire Setter Company

ROCHESTER, N. Y.

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"GOOD AD" SIGNS

FOR

Advertising your line of goods to your agents and customers

WINDOWS AND DOORS, SHOW CASES, ETC.

REGULAR TRANSFERS

FOR

Decorating, Lettering and Numbering any job you have to do.

SPECIAL DESIGNS

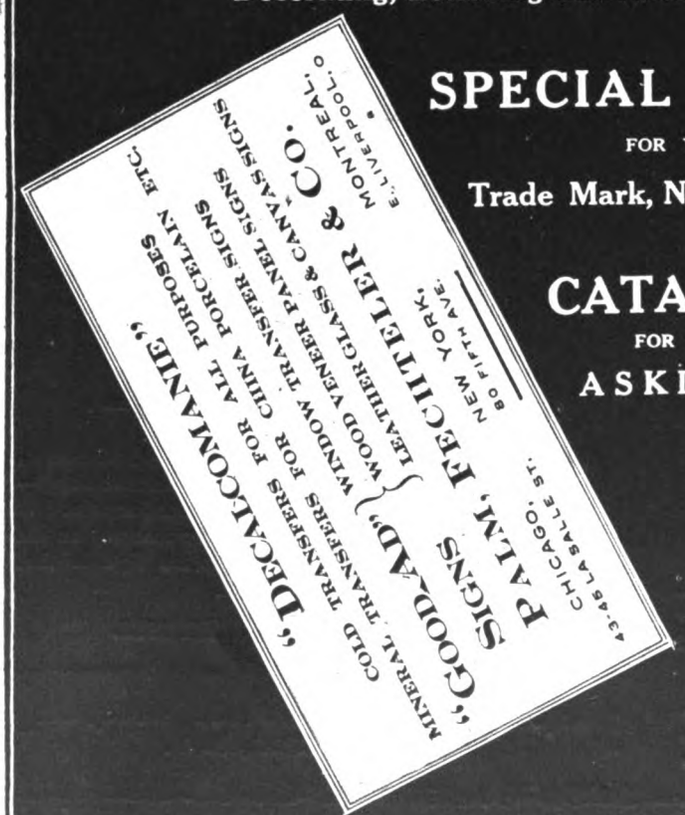
FOR YOUR

Trade Mark, Name Plate, Etc.

CATALOGS

FOR THE

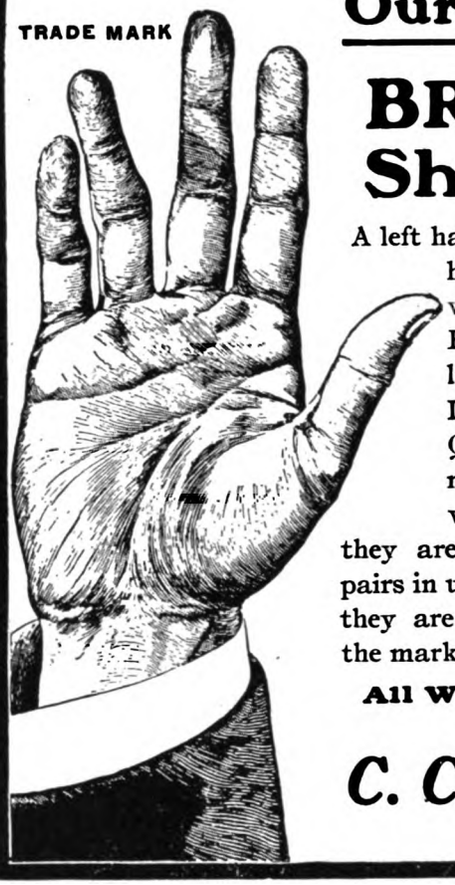
ASKING.





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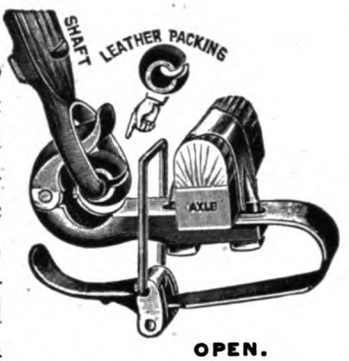
TRADE MARK



Our Trade Mark

Represents the only Tool required to operate the

BRADLEY Ball Bearing Shaft Coupling.



OPEN.



CLOSED.

A left hand will do as well. We are willing to hold up our right hand and swear that we are the original makers of a Ball Bearing, Leather Packed Shaft Coupling, that **Bradley Couplings** are Drop Forged from Bar Steel, are Silent, Quick Shifting, Self Lubricating, Automatically take up their own wear and will outwear any vehicle to which they are attached. There are over a million pairs in use. Quality and advantages considered, they are the cheapest and best couplings on the market.

All We Ask is a Chance to Prove Our Statements.

C. C. Bradley & Son,

Syracuse, New York, U. S. A.

1843 **1907**

THE "EAGLE" ANVIL WORKS, Trenton, N. J.

The "EAGLE" is the ONLY ANVIL MADE IN TRENTON.

THE VERY FIRST MADE IN AMERICA.

None Genuine without the Eagle Trade Mark and "Fisher" stamped on side and end.

Cheaper and Better than any others.

More than 200 different patterns.

PATTERNS.

Regular Blacksmith, Farriers', Farriers' Clip Horn, Plow Makers', Baby Vise and Anvil, Double Horn, Saw Makers', Instrument Makers', Chain and Axe Makers', Etc. Etc. Etc.

Weights from 10 to 800 lbs.

Do you want to be prosperous? Have you pride in your country? Then use an "EAGLE" ANVIL AND VISE, the first made in America. Low in cost and high in value. A **guarantee** goes with every anvil. To meet the demands of everyone, we have recently introduced to the public our **"BABY ANVIL AND VISE"** especially for the use of automobilists. At the Automobile Show, Madison Square Garden, New York, recently, the "Baby Anvils and Vises" were greatly admired and many were sold.

THE "EAGLE" ANVIL

has always taken the FIRST PRIZE at every exhibition wherever entered, from the Gold Medal awarded by the American Institute of New York in 1853, to dozens of others since, including the Centennial at Philadelphia in 1876 and the World's Fair at Chicago in 1893—the latest being that of the National Export Exposition of 1899 in Philadelphia. We have not sought further honors in that direction since: they are really of little interest or value. The practical experience of the working Blacksmith is worth very much more than the opinion of the gentlemen on the Prize Committees, obtained only from a hurried examination instead of any actual knowledge of the anvil's real excellence for work. Our prices are so low and our guarantee so absolute that every Blacksmith buying from us now can get the best anvil in the world for his money.



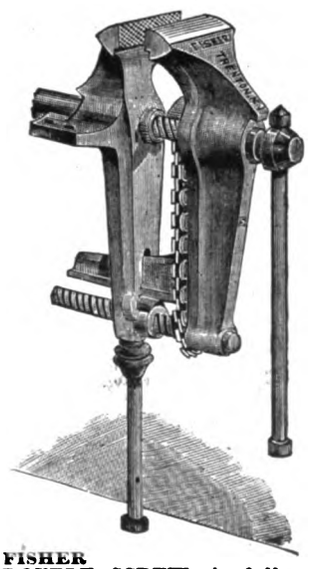
We Make to Order ANVILS of any Special Dimensions or Shape.

Warranted Better than the Best ENGLISH ANVIL.

Face in one piece of **Best Tool Cast Steel, Perfectly Welded,** perfectly true, of hardest temper, and never come off or "settle." Horn of tough **untempered steel** never to break or bend. **Only Anvil made in the United States fully warranted as above.**

Write for Descriptive Circulars and Special Discounts.

Sold only by Reliable Dealers all Over the World.



FISHER DOUBLE SCREW is fully warranted stronger than any other leg vise and always parallel. Is the best vise for machine shops and blacksmiths and for all heavy work. Accurate and durable.

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SOME POPULAR TOOLS

Royal Blower

"The Successful Blower"



Crank Turns Forward or Backward.

Noiseless and Easy to Operate

Gear case is oil-tight and dust-proof. Gears run in a continuous bath of oil.

Gears are Phosphor Bronze and Steel, flat and straight cut. No Spiral or Worm Gears.

Fire-pot is 8x9½x4 inches inside.

A powerful blast; lasting after blast

Fan, 12 inches. Height, 47 inches. Weight, 135 pounds.

Can be furnished to operate with the right arm, for left-handed smiths, when desired.

Royal (Western Chief) Forge No. 100

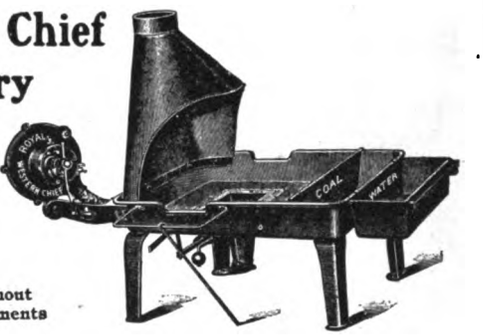


For use of Large Blacksmith, Wagon, Plow, Railroad Shops, Etc., where Heavy Work is Done, and a First-class Forge and Fire Are Needed.

Fan, 12 Inches.
Height, 30 Inches.
Weight, 300 Pounds.
Hearth, 31½ x 48½ Inches.
Length Over All, 53 Inches.

In this Forge we combine our "Royal" style of Blower with Western Chief Standard Hearth, having Solid Fire-pot with Tuyere Ball Furnishing side and center blast. We guarantee it fully.

Western Chief Stationary Forges



Six Different Styles

With or Without Blower Attachments



ROYAL FIRE-POT

Needs No Clay

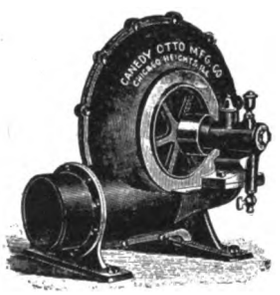
Dimensions 8 x 9½ 4 inches inside

Tuyere Iron

Write for catalogue describing our full line of

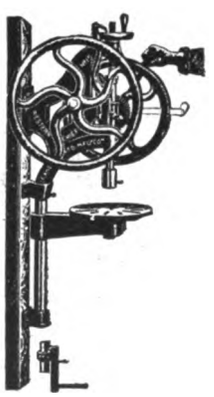
Forges, Blowers and Drills

For sale by first-class dealers all over the world.

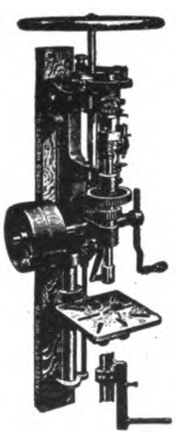


Western Chief Power Blowers

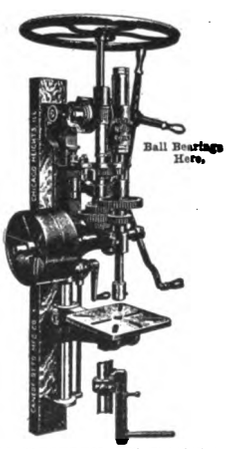
Built in sizes suitable for from one to seven fires



No. 15 WESTERN CHIEF DRILL.
Automatic Self-Feed.
19 in. Circle.



No. 14 WESTERN CHIEF DRILL.
Automatic Self-Feed, and the only AUTOMATIC Quick Return Foot Drill Made. 21 in. Circle.



No. 16 WESTERN CHIEF DRILL.
Automatic Self-Feed and Hand Lever Feed. Largest Foot Drill Made. 24 in. Circle.

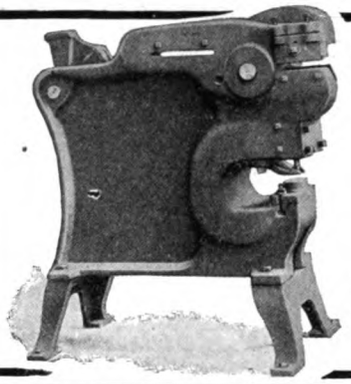


No. 17 WESTERN CHIEF DRILL.
Automatic Self-Feed and Hand Lever Feed. 24 in. Circle.

MADE BY **CANEDY-OTTO MANUFACTURING CO.**

CHICAGO HEIGHTS, ILLINOIS

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NO. 5 COMBINED PUNCH AND SHEAR.

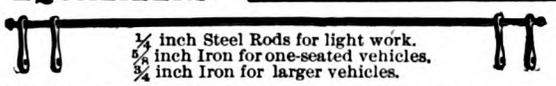
Punches 5/8 in. hole through 5/8 in. iron.
Shears 5 in. x 1/2 in. flat iron bars.
Shears 1 1/4 in. round iron bars.
Shears 8 in. x 1/4 in. band iron.

Our large descriptive circular will interest you. So will our price.

Badger State Machinery Co.

19-25 Trinity St. Janesville, Wis.

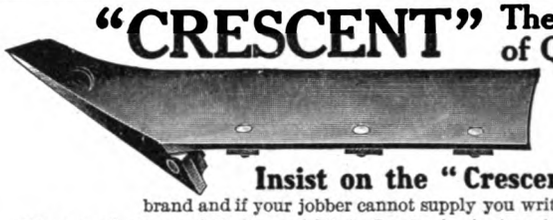
STEEL EQUALIZERS---FOR SIDE SPRING BUGGIES



1/4 inch Steel Rods for light work.
5/16 inch Iron for one-seated vehicles.
3/4 inch Iron for larger vehicles.

THE TOPLIFF & ELY CO., Elyria, Ohio.

"CRESCENT" The Mark of Quality





Insist on the "Crescent"

brand and if your jobber cannot supply you write us direct.

We manufacture a full line of High Grade Agricultural Steel Shapes, Fitted and Bolted Plow and Lister Shares, Merchant Plow Shares, Cultivator Blades, Subsoiler Blades, Landsides, etc., etc.

WRITE FOR CATALOGUE.

CRESCENT FORGE & SHOVEL CO., Havana, Ill., U. S. A.

UPRIGHT DRILLS



THE BEST IN THE LAND

These machines are arranged for both hand and power The balance wheel shaft is lengthened and has a three-step cone pulley, 2-inch belt.

The countershaft, with hangers, has a three-step cone pulley, and 7-inch tight-and-loose pulleys for 2 1/2 in. belt.

Weight of No. 5, 200 pounds.
Weight of No 6, 255 pounds.

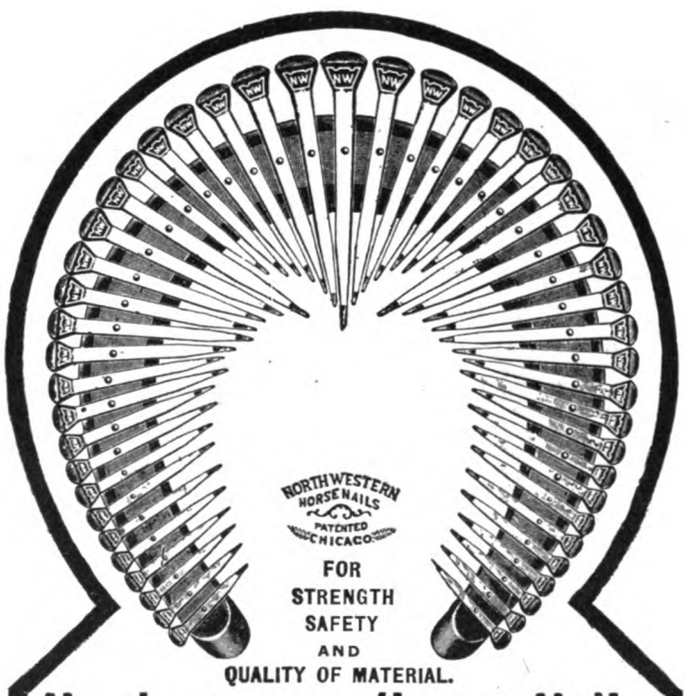
We also furnish Nos. 5 and 6 Drills with tight-and loose pulleys, 7-inch, 2-1/2 inch face applied to balance-wheel shaft.

Nos. 5 & 6.

Write for Particulars.
PRICES ON REQUEST.

Francis Reed Company

43 Hamden St., WORCESTER, MASS.



FOR STRENGTH SAFETY AND QUALITY OF MATERIAL.

Northwestern Horse Nails

ARE THE BEST ALL AROUND

The most perfect in form and finish. Made of the best Swedish Iron. Will hold a shoe longer than any other nail made. Note the re-enforced point—makes it easiest to drive and the safest to use.

UNION HORSE NAIL CO., CHICAGO, ILL.

Colville, Wash., Feb. 9. '07.

GEO. BARCUS & CO.

Gentlemen:

Yours of Feb. 2nd at hand. I received the stocks February 4th, have them up and have shod one horse in them and have another for Monday morning. I shod a horse in 45 minutes, that I have been throwing before I got the stocks. I took one shoe off at a time, sharpened it and put it back. Before, it took me from two and a half to three hours, and once he laid me up for a week. Will forward more money in a few days.

Yours truly,

C. C. DARNELL.

BARCUS HORSE STOCKS



ARE THE BEST AND CHEAPEST ON THE MARKET

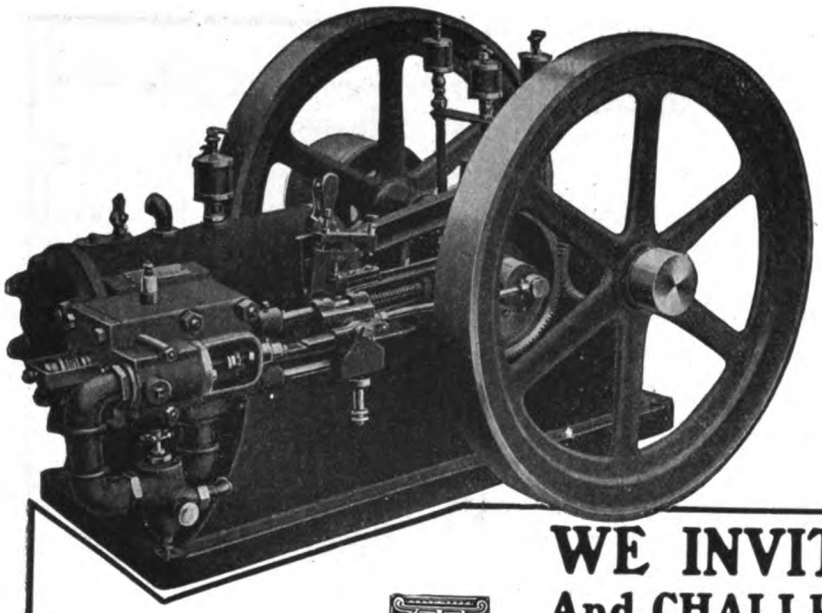
FOR FULL PARTICULARS WRITE

GEO. BARCUS & CO.

Box 61,

WABASH, IND.

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The WILLIAMSPORT GAS and GASOLENE ENGINE

Always Ready to Start.

No Engineer Required.

No Increase in Insurance by their use.

WE INVITE INSPECTION And CHALLENGE COMPETITION

OUR "GIANT" 4 H. P. Engine

The Best on the Market for the user of small power. Write for details.

WILLIAMSPORT ENGINES are constructed by the most skilled workmen, and only the very best material used. We offer you an Engine of the Finest Quality, noted for its Simplicity, Durability, Ease of Operation and Beauty of Design. Our broad Guarantee covers all.

ILLUSTRATED CATALOGUE SENT FREE. Write Today.

Williamsport Gas Engine Co.

WILLIAMSPORT, PENNA.

OUR GUARANTEE.

All Engines Absolutely Guaranteed free from all defects in workmanship and material. Any part found defective or faulty will be replaced by us free within one year from date of purchase.



SPECIAL OFFER

"REECE" SCREW PLATES

With Patent Adjustable Guides

No. 12 Reece Screw Plate with patent adjustable guide stock and 5 sizes taps and dies, ¼, ⅜, ½, ⅝ and ¾ ins., complete in case, **Special Net Price, $7.87. Or**

No. 122 Reece Screw Plate, same as No. 12 set, with Hercules Adjustable Tap Wrench included (see illustration of tap wrench above). **Special Net Price, $8.72.**

ORDER FROM YOUR DEALER

If he cannot supply you, write us direct

NO BETTER SCREW PLATES MADE THAN THE CELEBRATED REECE KIND

Our illustrated catalog is sent free. Write today.

THE E. F. REECE CO.

GREENFIELD, MASS. U. S. A.

Little Giant

COMBINED

Punch and Shear.

The Most Powerful Lever Punch and Shear Made.

5 Punches and Dies with Each Machine.

MADE IN THREE SIZES.

No. 1—Will punch ⅝-inch hole in ½-inch iron. Cuts iron ⅝-inch thick and 1-inch round. Weight, 515 lbs.

No. 2—Will punch ½-inch hole in ⅜-inch iron. Cuts iron ½-inch thick and ⅞-inch round. Weight, 350 lbs.

No. 3—Will punch ⅜-inch hole in ⅜-inch iron. Cuts iron ⅜-inch thick and ¾-inch round. Weight, 280 lbs.

Only ONE operation of the Lever does the work. No changing required.

Note the improved Stripper and Hold-down. This machine is made for the blacksmith shop, and we DO claim that it is decidedly the best on the market for that place.



For Sale by your Jobber. If not, Write Us. Send for Circular.

Little Giant Punch & Shear Co., Sparta, Ill.

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YEARS  AGONE

Men were satisfied with old fork wrench methods—now, it is simply a needless waste of time, temper and "knuckle skin" to handle tire-bolts with any ordinary wrench, when a little "Bay State" can be had that will so quickly (and so "slickly") set up or release such bolts. Blacksmiths, Wheelwrights and "Horse Sense" people in general, who have once met a "Bay State," never use any other sort.

THE BAY STATE CARRIAGE AND TIRE BOLT RATCHET WRENCH.

If your dealer don't have them, write us for tool lists for busy men.

TUDOR MANUFACTURING CO., Worcester, Mass.

Morse Twist Drill & Machine Co.

NEW BEDFORD, MASS., U. S. A.



Tools for Blacksmiths' Use.

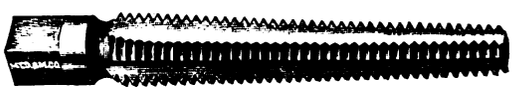
Twist Drills, Reamers, Taps, Chucks, Cutters, Dies, Machinists' Tools, Machinery.

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"MORSE"

the name that guarantees "quality," "accuracy" and "economy."

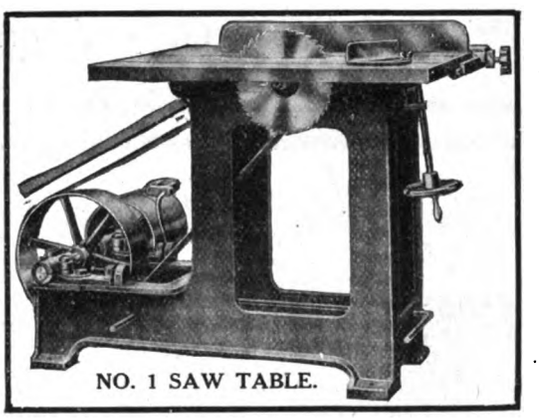
BLACKSMITH TAPER TAPS.



CRESCENT MACHINES ARE EARNING MONEY

for blacksmiths and wagon makers all over the land and can do the same for you. The growing demands of your trade will eventually compel you to put in Wood-Working Machinery, and now is the time you should consider equipping your shop with

Crescent Machines.

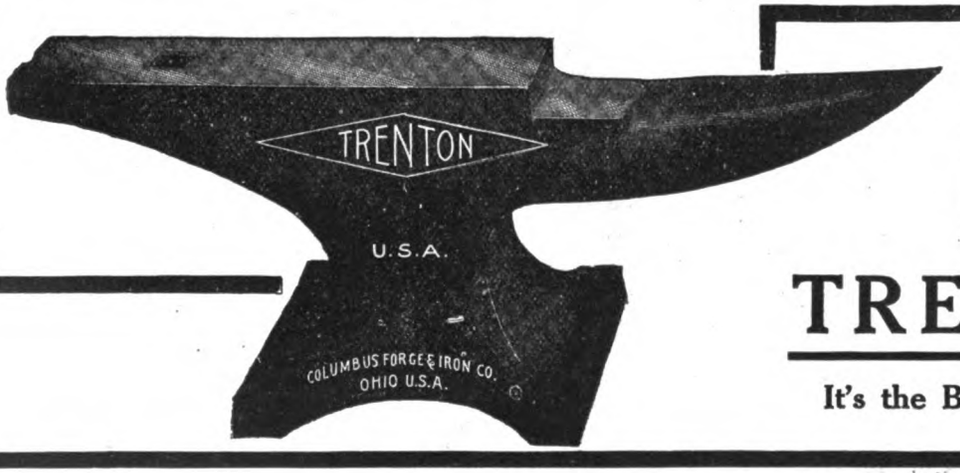


NO. 1 SAW TABLE.

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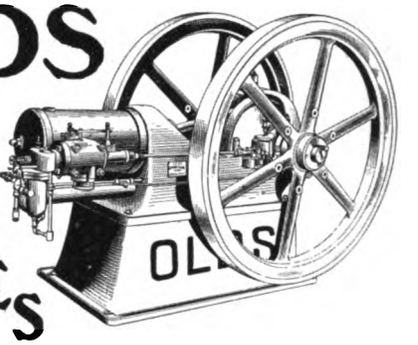
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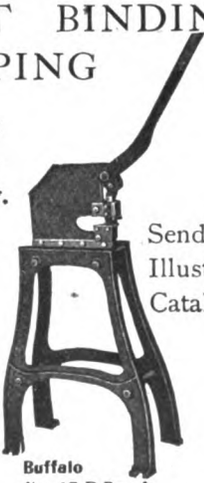
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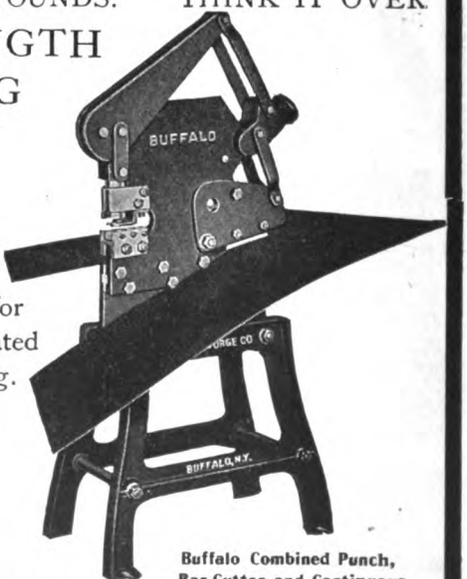
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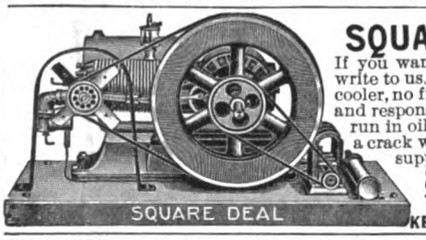
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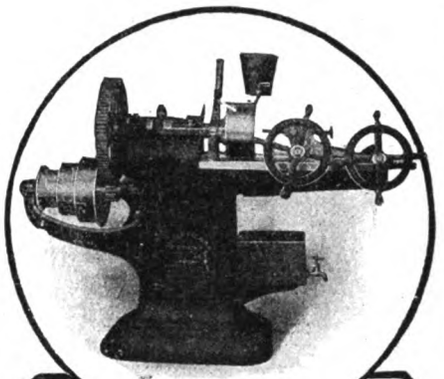
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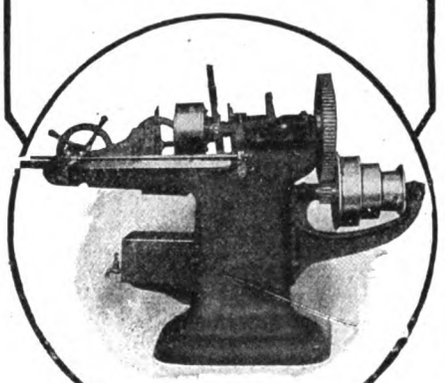
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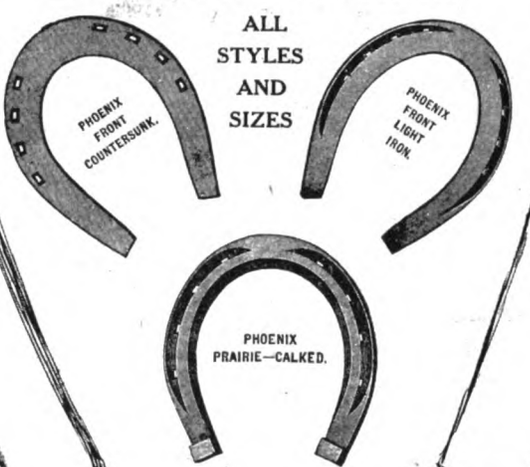


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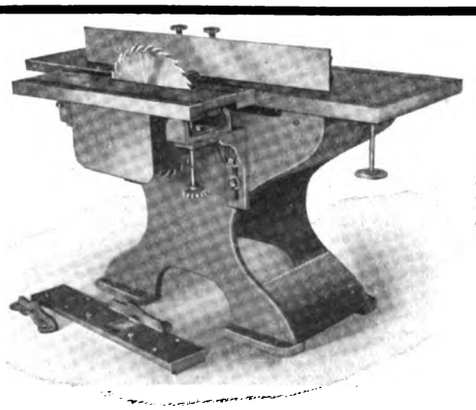


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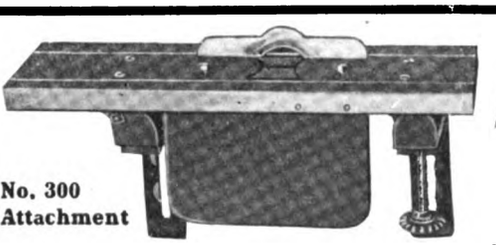
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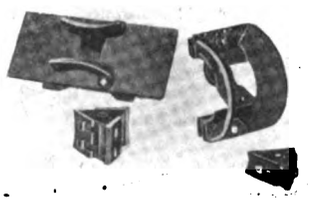
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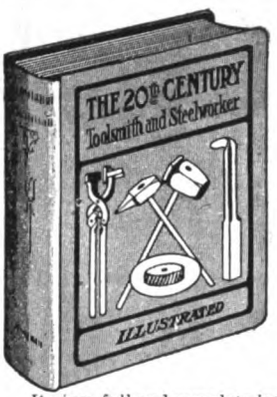
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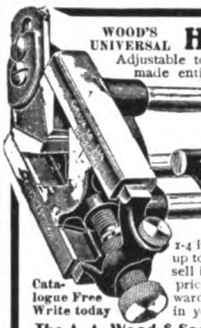
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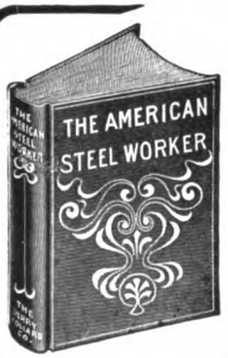
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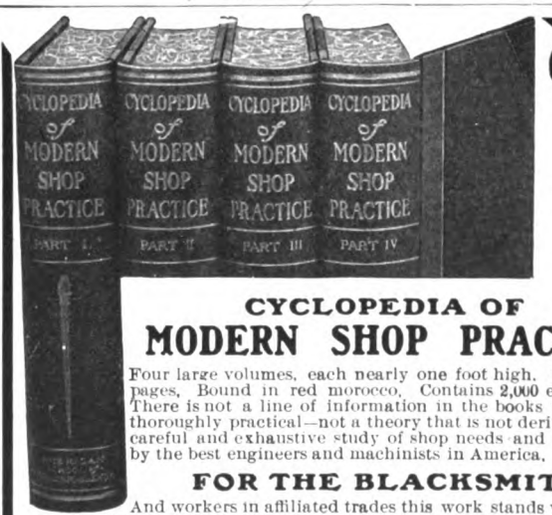
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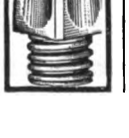
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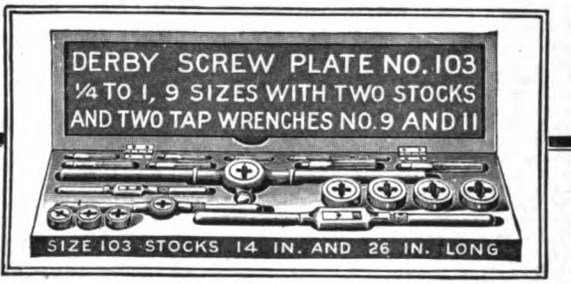
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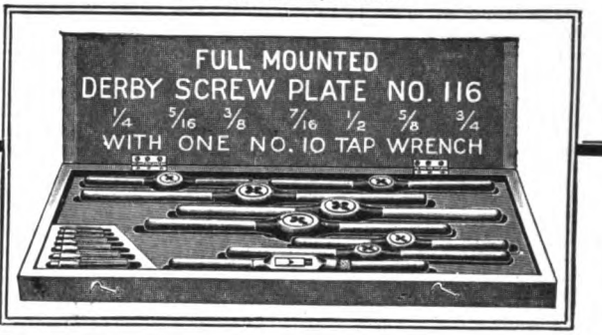
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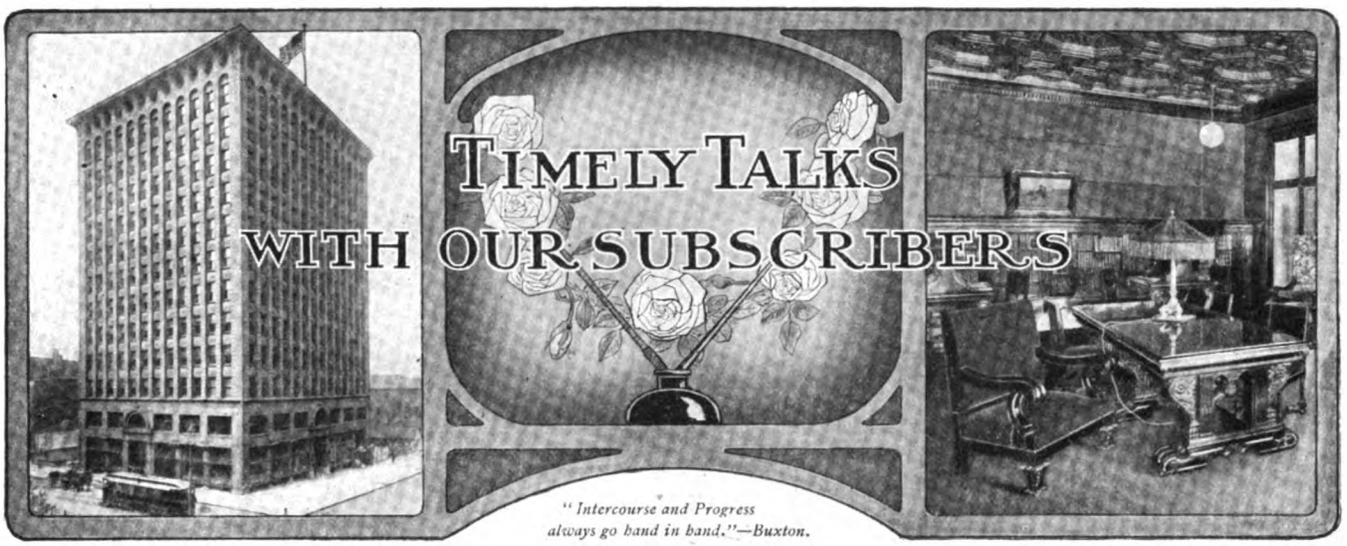
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Subscribers should notify us promptly of non-receipt of paper or change of address. In the latter case kindly give us both the old and the new address.

There are lots and lots of smiths in poor localities—localities where one or two smiths less would enable the remainder to at least make a good living. In an endeavor to overcome this state of affairs in the good old craft, we desire our readers to advise us whenever they hear of a good location for a good smith. Let us know about it, Mr. Reader, so that we can pass the good news on to some brother who is struggling under unfavorable conditions. Of course, if you desire to take the new location yourself, do so by all means, but when you hear of a location that would prove good for some brother, pass the information on to us. There will be no charge whatever for this service except your time to write us about the opportunity. Just tell us the locality needing a smith, give us all the information you can about it and we will pass the information on to those wanting to change. Perhaps you can give us a hint or two right now about some localities. Just address the Opportunity Bureau.

They certainly make a strong team—the "Honest Dealings" paragraph and our pink Buffalo stamps. Every day finds them gaining in popularity, not only among readers, but advertisers as well. A reader wants a paper in which he is sure of the honesty of the advertisers, and the advertiser looks to the paper in which he is assured of good company. Our team have pulled us right into the heart of both readers and advertisers, and what's more, we deserve to be there. Our endeavor to honestly represent the craft, to honestly protect the welfare of its members and to honestly serve them to the best of our ability is gaining for us the unstinted support we were sure it would. We have ever served the craft with the idea that nothing was too good for its members and are ever on the look-out to coöperate with them. "Smiths at the first table," was the slogan in the first issue. "Smiths at the first table" is the slogan now. The AMERICAN BLACKSMITH is for, by, and with the smith always. We want your support and—tell your neighbor.

Contents, June, 1907.

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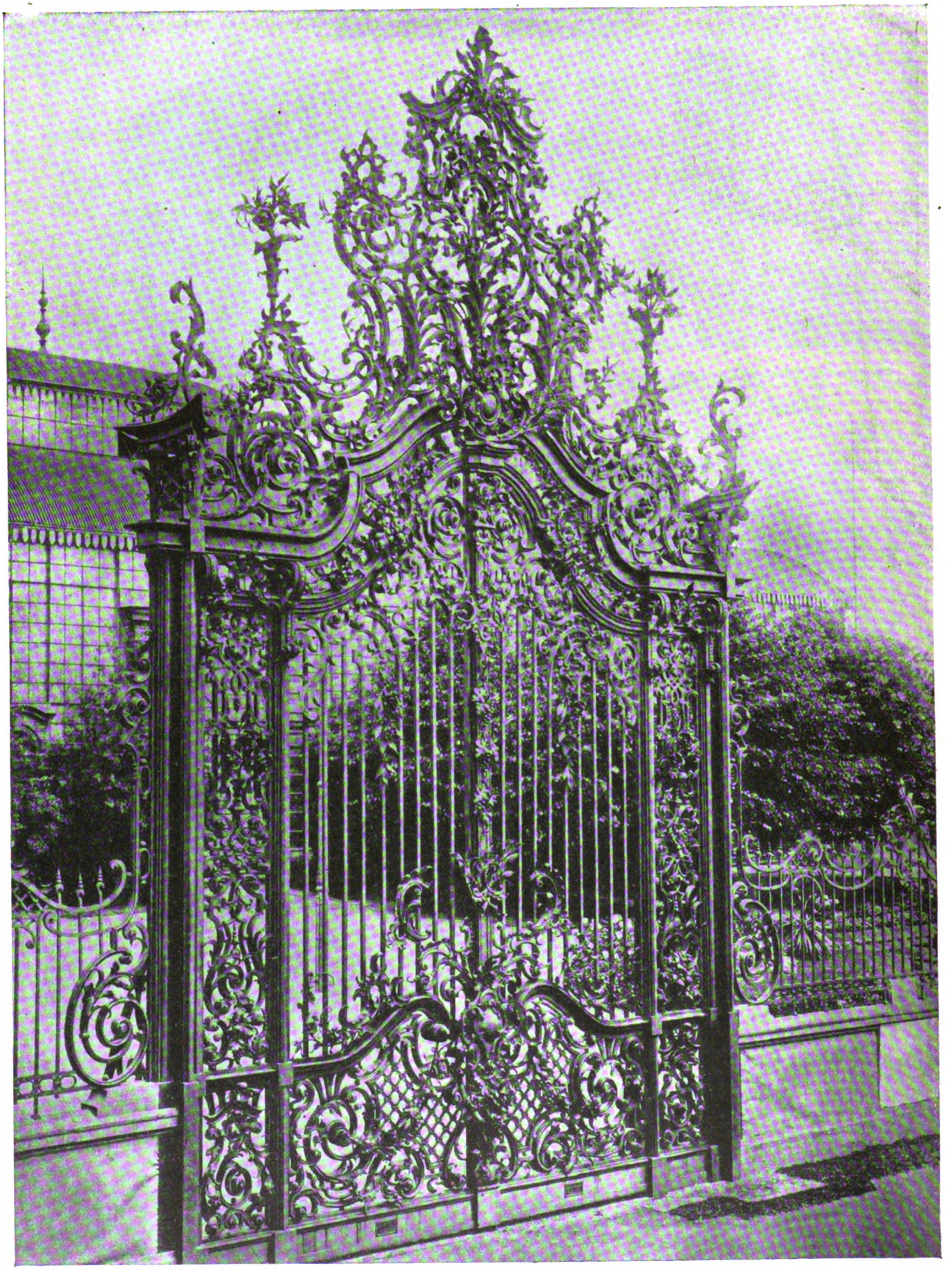
It's not good business management to have any machines idle for any great length of time. They take up valuable space and their value is declining every day. Ever figure it that way? Why not get rid of these profit eaters by means of an AMERICAN BLACKSMITH want ad? Turn the money eater into actual money. The cost is so small as to not bear mentioning, while the chances of your selling the machine are—well, you know how many smiths read the paper every month. Most every one of them is interested in the wants and you find many opportunities there for turning loss into profit. Look about the shop or loft—if you've got a profit eater, let us turn it into money for you.

Do you know of any "lady smiths," Mr. Reader?—Any member of the gentler sex who do smithing, wagon work or horseshoeing? We would like very much to get in touch with all of them and want your coöperation. If you know of any women who do smith work or who know anything about it, send in their names and addresses. If you know anything about their work, tell us all you know. These "lady smiths" have not received the attention they deserve and we are going to see that they're represented. This request is for foreign readers as well as readers at home, and we want you to write us today if you can. There are few women actively occupied with the smithing craft, so if you know of but one, let us hear about it.

To Our Canadian Readers.

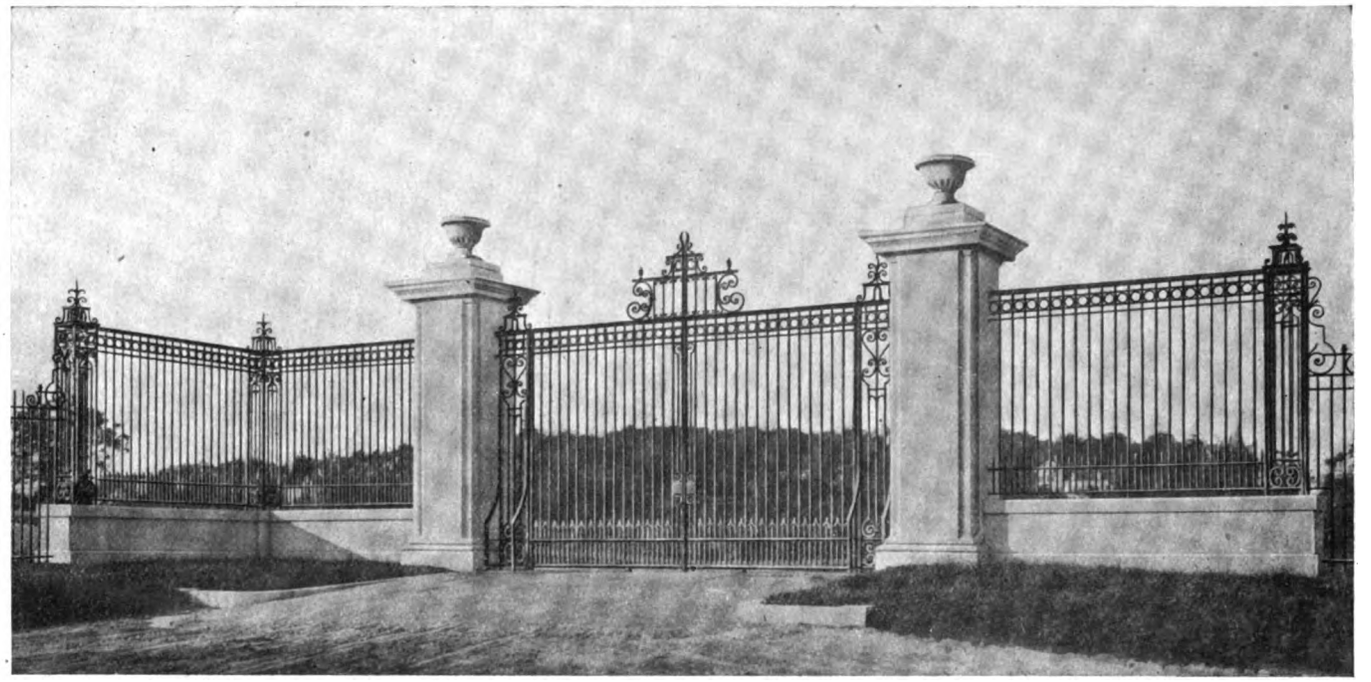
By reason of the advanced postage rate on all second-class mail matter for delivery in Canada, the yearly subscription price of THE AMERICAN BLACKSMITH, to Canada, has been advanced to $1.50. We would therefore have our Canadian readers bear in mind the advanced rate when sending in their renewal subscriptions. Of course, all present subscription obligations will be filled, regardless of the very material postage advance, or the time the subscription order was received.

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AN EXQUISITE EXAMPLE OF HAND-WROUGHT WORK FROM THE FORGES OF ARMBRUSTER BROTHERS OF GERMANY. THIS IS ONE OF THE MANY SIMILAR GATES THAT LEAD TO THE GROUNDS SURROUNDING THE GERMAN EMPEROR'S PALACE AT POTSDAM

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SIMPLICITY AND DIGNITY OF DESIGN COMBINE TO MAKE THIS ENTRANCE GATE AN EXCELLENT ONE FOR A CEMETERY

Ornamental Work in Metal

Iron, Bronze and Copper

M. F. HARPER



MODERN ornamental work in metal finds expression not only in iron, but in copper, bronze and the precious metals. Our field, however, is confined principally to iron with an occasional piece of work in copper and bronze. Wrought iron has within the past few years become very popular, not only as a material for gates, railings, lamps and the like, but for small candlesticks, wall lights and numerous other articles of interior home furnishings as well. The very popular wrought-iron finish, so called because of its similarity to the wrought iron as finished by the smith, is seen on picture frames, small furniture and many other articles of home use and decoration. We find examples of ornamental wrought work in public buildings, parks, cemeteries, private grounds and in the home. We find gates, stairways, lamps, railings, andirons, lamp standards, fire-tongs, screens, lawn seats and an endless variety of things in this metal.

The trend of modern design in wrought work is more than ever toward simplicity and dignity. The ornate and extreme ornamentation of earlier artists in metal work is seldom encountered now. Simplicity and plain beauty rather than the gaudy over ornamentation seem to be the governing qualities.

Modern wrought work is also more in keeping with the general plan of its location. The gateway, for instance, admitting to grounds that are extremely plain must also be plain in its general plan. An extremely ornamental gate and railing, as an enclosure for grounds and buildings that are plain in their general character, would be very much out of harmony.

This same endeavor toward harmonious composition must also be kept in sight in the forging of small articles. In fact, harmony of composition is the secret of successfully forging wrought work. Whether iron, bronze, copper or the precious metals, the value of harmony must be considered. It is the basis of artistic beauty. A finished piece of wrought work may be perfect in workmanship, execution and other details and still be lacking in harmonious composition. And lacking in this latter quality, the work cannot, no matter how fine the workmanship or how careful the forging, be called a good example of wrought work. In short, then, to produce an artistic example of ornamental wrought work, we must have, first harmony of composition; second, good workmanship and third, execution.

The modern worker in artistic iron while doing some excellent work, cannot, however, compete with some of the examples of extremely delicate work turned out by the ancient artists. A remarkable example of delicate work-



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GATES AND RAILING OF VERY APPROPRIATE DESIGN ENCLOSING CHURCH AND GROUNDS OF ST. ANN'S CHURCH IN NEW YORK CITY

manship in bronze work, for instance, is now in the British Museum. These bronzes are a pair of shoulder-pieces from a suit of armor, and each shows in high relief a combat between a Greek warrior and an Amazon. No work in metal has probably ever surpassed these little figures for beauty, vigor and expression, while the skill with which the artist has beaten these high reliefs out of a flat plate of metal appears almost miraculous. The heads of the figures are nearly detached from the background, their substance is little thicker than paper and yet in no place has the metal been broken by the hammer.



AN ORNAMENTAL AS WELL AS A USEFUL SHOE

A Special Shoe Both Artistic and Practical.

J. E. MOORE.

The accompanying engraving shows a master mason's horseshoe that is both artistic and practical. By leaving the compass or dividers solid, using the arms of the square as a bar and cutting off the end of the shoe you have a fine shoe for quarter crack. Leaving them solid and the shoe as it is now, it is a good shoe for navicular trouble. This shoe is original with myself for as far as I know, no one else has made one. I have been a Mason for years and prize the fraternity's teachings very highly. There is no secret craft that knows more about the square and the compass, or that uses it more. Nor is there any craft that should know more about these tools than the shoeing craft. By the square the shoer gets the angles of the foot, while with the compass he can balance the action.

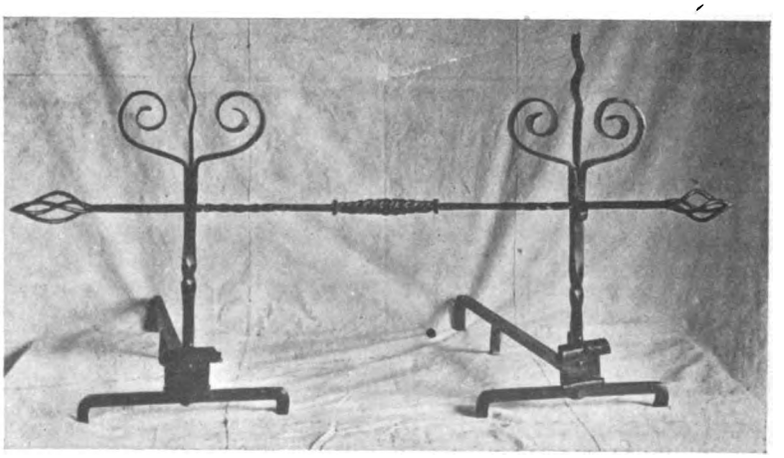
A Flower Stand and a Set of Wrought-Iron Andirons.

A very original piece of ornamental iron work is shown in the accompanying engraving showing a flower stand of wrought iron. The stand weighs 27 pounds and has holders for eleven flower pots. The legs of the stand are of ¼ by ¾-inch stock at the bottom, tapering to lighter weight toward the top. As shown in the engraving, they are twisted their entire length. The ends of the pieces forming the side uprights of the holders are forged to resemble leaves. This piece of very creditable wrought work is from the forge of August Hohngren of Minnesota.

The other engraving shows a very neat set of andirons. They are agreeably free from gaudy ornamentation, and show much skill in workmanship. The scrolls and twists are very well executed and show that the forger is well versed in the art of iron working. The general appearance of the irons is very pleasing, and we understand that Mr. John F. Bryce of New York, who forged them, makes a specialty of ornamental iron work.

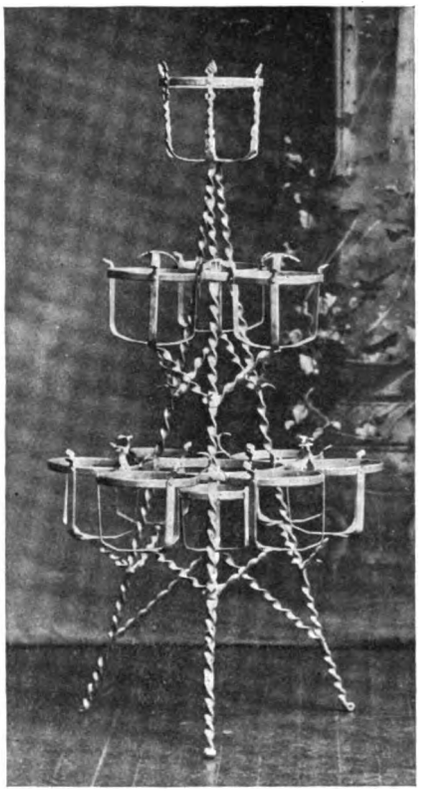
Several Artistic Wrought-Iron Gateways.

The several engravings shown of ornamental wrought iron gates are excellent examples of the wrought work as used in modern architecture. The large entrance gate on page 195 admits to a



A SET OF ANDIRONS OF VERY NEAT DESIGN BY A YORK STATE SMITH

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AN ORNAMENTAL FLOWER STAND WITH SUPPORTING BARS OF TWISTED STOCK

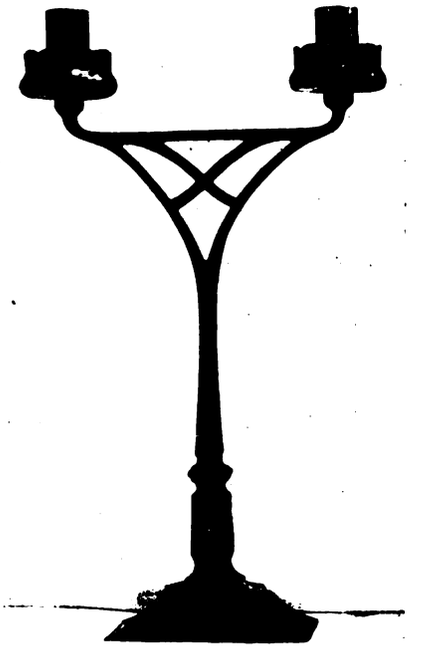
cemetery and is a most appropriate design. The simplicity and dignity of this gateway makes it especially pleasing as an entrance way to the place of rest. The entrance gate shown on this page also stands at the entrance to a cemetery and is another example of dignity and grace. The ornamentation of this entrance is just sufficient to make it individual, and yet is far from being over ornate. The gates and railing at the top of page 196 are very much in keeping with the general scheme of architecture. Here is combined strength with utility, and beauty is not far in the background. This design is very simple and shows a very pleasing example of straight bar work. These several examples of entrance gates are from the fires of the Anchor Post Iron Works of New York City, and to whom we are indebted for these reproductions

Ornamental Work in Hammered Copper.

THOMAS GOOGERTY.

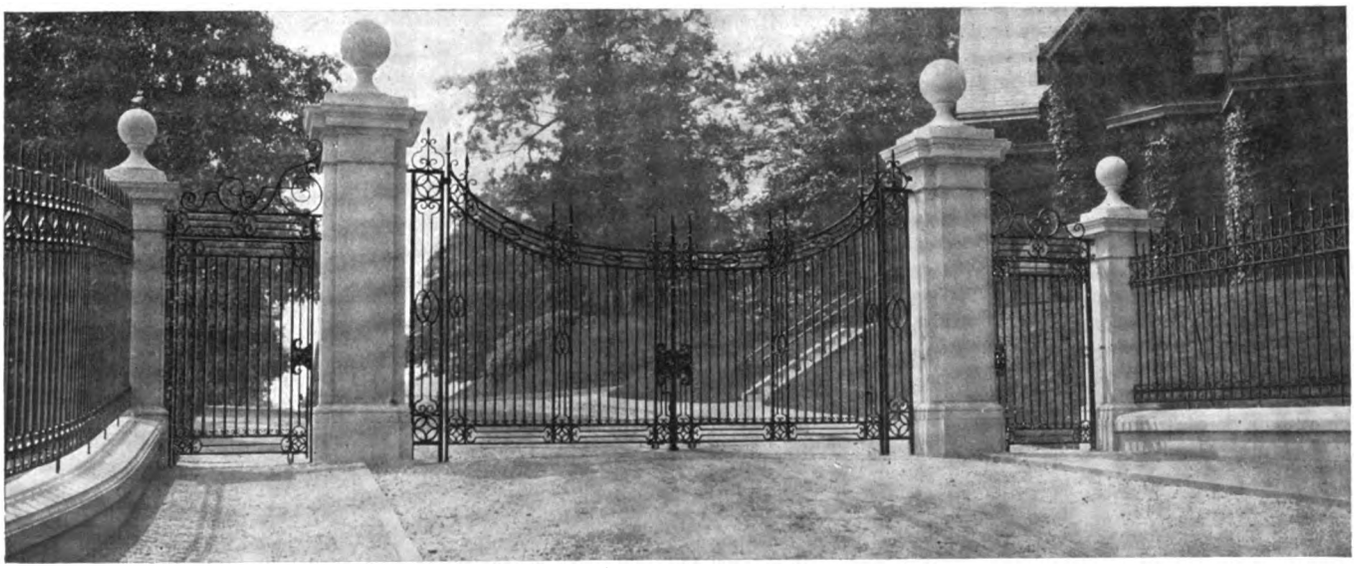
In the last few years art copper work has made a great advance in this country; it is not only being worked by professional designers and craft workers, but a great many schools throughout the country are teaching it. Sheet copper and brass readily lends itself to be fashioned into many beautiful and useful objects for the decoration of the home. There is something about this metal that appeals to one, and to the worker it keeps up a fascinating interest. It is my object in this article to explain a method of working out a design for a simple but very effective card tray, that may be worked out by blacksmiths.

In working up a tray after a design like D in the illustration, the copper used may be number 20, or a little heavier. It is first cut with a pair of tinner's snips seven and one half inches in diameter, and its edge smoothed with a file. A circle is then described with a pair of dividers $\frac{5}{8}$ of an inch from its outer edge; this part will be the rim of the tray. This rim is now raised by hammering with a wood mallet on the inside of the circle, using as an anvil a piece of hard wood fastened in a vise, the wood being sawed the same shape that the rim of the tray will take when finished. With the mallet it is hammered around the rim of the tray until it is raised about $\frac{3}{4}$ of an inch. See Fig. 2. The part outside of the circle may then be hammered flat, being careful to work out all kinks. It is now turned over and hammered on a surface plate or a level piece of wood to remove the dents. It is then ready to receive the design.



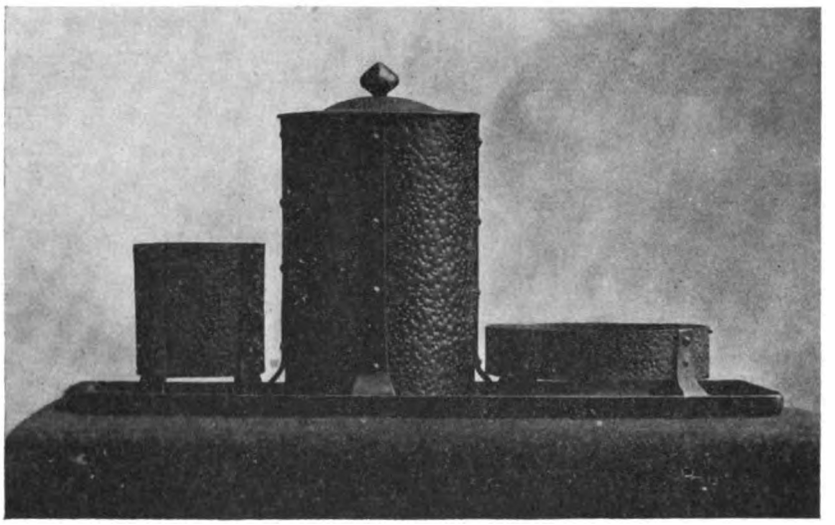
AN EXCEPTIONALLY NEAT AND ARTISTIC DESIGN IN WROUGHT IRON

The design is drawn with a lead pencil on paper inside of a circle described with a $2\frac{1}{2}$-inch radius. The design may be copied from the tray illustrated, or some other motif may be used. However, after it has been drawn carefully, a sheet of carbon paper is placed on the tray and the drawing placed over it. The pencil marks are now gone over with a hard



A VERY GRACEFULLY DESIGNED GATE PLEASINGLY FREE FROM OVER ORNAMENTATION. IT ACCORDS WELL WITH ITS SURROUNDINGS

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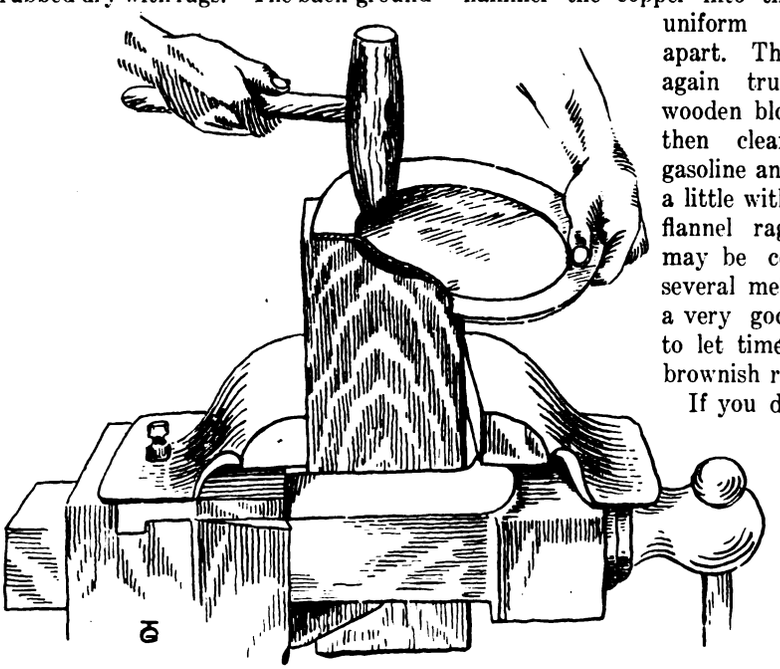


A SMOKING SET IN HAMMERED COPPER FROM ILLINOIS STATE REFORMATORY

lead pencil, thereby making a carbon drawing on the copper. The carbon lines are then gone over with a hammer and a small cold chisel. This chisel is made of $\frac{5}{16}$-inch round tool steel, ground with a short, thick bevel, the flat part being $\frac{5}{32}$ of an inch wide. The line is not cut very deep, just enough to leave a little channel. This line is then gone over with a similar tool, but instead of it being sharp the face is dull. This makes a sunken line $\frac{1}{32}$ of an inch wide. These tools are made narrow in order to follow a curved line.

The tray must now be trued again. It is then smoothed with coarse and fine sand paper. It may then be put on a buffing wheel and finished, or it may be finished by hand, using rotten stone and oil. When the tray is polished it must be cleaned with gasoline and rubbed dry with rags. The back-ground in the design is now gone over with a hammer and a matting tool in order to make the motif in the design stand out, giving the whole contrast and variety. The matting tool is 2½ inches long and is made of $\frac{5}{16}$-inch round tool steel. The tool is fastened in a vise, its end filed square and then with a very sharp thin center punch, the end of the tool is punched with a series of small holes close together. The sides of the tool are then filed square so that its face is $\frac{5}{16}$ by $\frac{3}{32}$ of an inch. It is then tempered. To mat the background of the tray, light hammering on the tool is all that is necessary, and the tray may be placed on the anvil, or on a surface plate while matting. The rim of the tray may be left plain, or the little beads may be embossed by laying the rim on a piece of lead, and with a punch that is rounded nicely on the end hammer the copper into the lead at uniform distances apart. The tray is again trued on a wooden block and is then cleaned with gasoline and polished a little with a cotton flannel rag. Copper may be colored by several methods, but a very good way is to let time put on a brownish red.

If you desire other tints or shades on your plates, you may color them black, red, or even violet and orange. There are several formulas for coloring this metal.



THE PLATE IS HAMMERED WITH A SPECIAL WOOD MALLET

A Table, a Stool and an Umbrella Stand in Wrought Iron.

The accompanying engraving shows three very artistic pieces of ornamental work in wrought iron by Mr. Thomas Nuttall of York State. The engraving shows a very neat design in the support for a table top and is very well gotten up. The stool is also very neat and shows how twisted bars add to the general effect. This is also shown in the umbrella stand, the shorter bars at the top being composed entirely of twists. The scrolls in both stand and stool are very neatly turned.

The Use of Alcohol and Gasoline in Gas Engines.—2.

C. E. LUCKE AND A. M. WOODWARD.

Thermal Efficiency.

As was pointed out before, the different kinds of machinery used to generate power render more or less of the fuel energy into useful work; all systems do not give equal returns for equal amounts of heat supplied. If all the heat energy in fuel were transformed into work with no losses whatever in the mechanism, the machinery would be said to have a thermal efficiency of 100 per cent, and it would require 2,545 heat units per hour to maintain an output of 1 horsepower. If half of the energy in the fuel were lost in the machinery, its thermal efficiency would be said to be 50 per cent, and there would be required 5,090 heat units per hour. If only 1 per cent of the heat energy in the fuel were transformed into useful work the efficiency of the machinery or power plant would be said to be 1 per cent, and there would be required 254,500 heat units per hour to maintain 1 horsepower.



A FEW NEAT WROUGHT PIECES BY BROTHER THOMAS NUTTALL

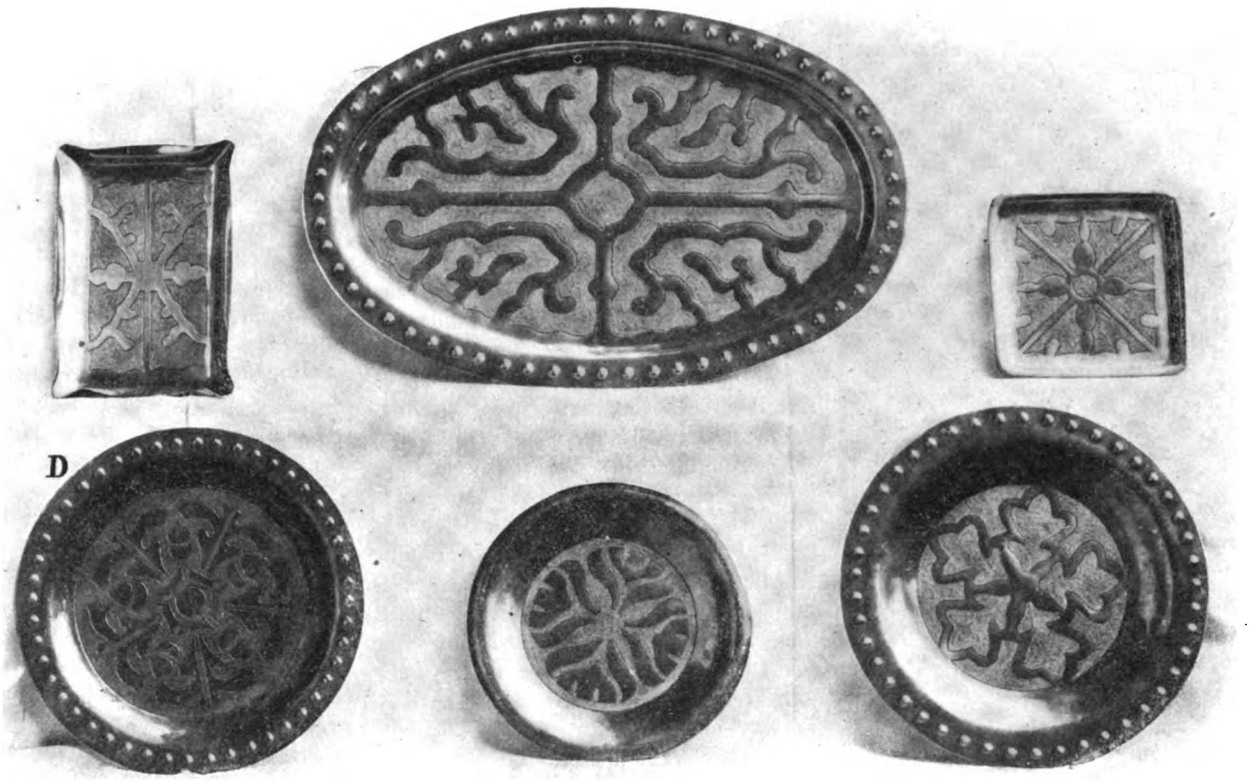
Steam plants in use represent a great variety of styles or types, but in general it may be said that the more complicated and refined the plant and the larger its size, the more efficient it is, because the

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complication exists only as evidence of an attempt to minimize the losses of heat in the machinery. Similarly, the more steadily the plant works at the steam plants lie between the limits of 2.5 and 10 per cent thermal efficiency.

Plants consisting of gas producers for transforming coal into gas for use efficiency of about 19 per cent under similar operating conditions.

The efficiency of an alcohol engine may be assumed at this time to be un-



THE FINISHED TRAY IS VERY NEAT IN APPEARANCE. TIME GIVES THE COPPER AN ARTISTIC TINT OF BROWNISH RED

output for which it was designed, the higher the efficiency of the plant, and conversely, the smaller the plant, the simpler the apparatus, or the more intermittently it works, the lower its efficiency. Steam-power plants are built today to do every conceivable sort of work, and range in size from 1 horsepower to 100,000 horsepower. For purposes of comparison, neither the largest nor the smallest should be used, nor the best performance nor the worst performance of these plants, but a figure representing a fair average for the conditions named should be taken. Large steam plants in their daily work seldom use less than 2 pounds of poor coal per hour for each useful horsepower (known as a brake horsepower), which is equivalent to about 25,000 B. T. U. per hour, and which corresponds to about 10 per cent thermal efficiency. Small steam plants working intermittently, such as hoisting engines, may use as high as 7 pounds of coal per brake horsepower, which is equivalent to about 100,000 heat units per brake horsepower hour, or 2.5 per cent thermal efficiency. Some plants will do better than the above with proper conditions, and some may do worse, but in general it may be said that the performances of in gas engines have in general a much higher thermal efficiency than steam plants doing the same work. They are, however, not built quite so small as steam plants, the smallest being about 25 horsepower, and in general they have not been built so large, the largest being only a few thousand horsepower. Their efficiency, however, does not vary so much as is the case with steam plants. It may be fair to say that under the same conditions as above outlined, these plants will use 1¼ to 2 pounds of coal of fair or poor quality per brake horsepower hour, which gives a thermal efficiency ranging from 18 to 10 per cent. These plants can be made to do much better than this, and perhaps may do worse, although the variation is not nearly so great as for steam plants.

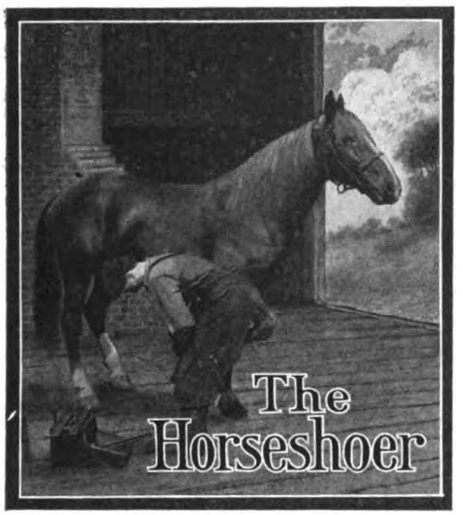
Gas engines operating on natural gas or on illuminating gas from city mains will, on fluctuation of load with the regular work, average about 12,000 heat units per brake horsepower hour, or 20 per cent thermal efficiency. Exploding engines operating on crude oil will average about 25,000 heat units per brake horsepower hour, which is equivalent to about 10 per cent thermal efficiency. Exploding engines using gasoline should operate at a thermal known, but as alcohol can be burned in engines designed for gasoline, it may be assumed that such an engine will have with alcohol fuel the same thermal efficiency as with gasoline, to wit., 19 per cent for fair working conditions.

From the above brief discussion of the efficiency of different methods of power generation from different fuels it appears that quite a range is possible, though not so great a range as exists in the case of cost of fuel energy. Efficiency is seen to lie somewhere between 2½ and 20 per cent for all the fuels under working conditions. It is known that actual thermal efficiency under bad conditions may be less than 1 per cent and under the best conditions as high as 40 per cent, but these are rare and unusual cases. The range given is sufficient to indicate that a highly efficient method may make the fuel cost per unit of power less with quite expensive fuel than it would be with cheaper fuel used in a less efficient machine. It is also perfectly clear that without proper information on the efficiency of the machine or the efficiency of the plant it is impossible to tell what the cost of fuel per horsepower hour will be, even though the price of the fuel be known.

The next installment of this series

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will be a practical talk on the mechanism of the gas engine and an explanation of its various operations. Diagrams will be given to enable the owner to understand the principles of the engine.



When you have a lame horse and you cannot locate what makes him lame, take some water and a cloth and dampen the hair, but not enough to let the water run down to the lower part of the leg and keep it wet. Dampen from the top of the hip to the foot. At the place where it dries first, that's the seat of the fever and your lameness. R. D. PATTERSON.

The Frog: Its Importance to the Foot.

J. H. HARRIS.

Situated at the back of the foot, between the heels, and filling the entire hoof space behind the coffin bone is the frog. It is a mass of fibrous, elastic, rubber-like consistency, and its function is to relieve shock. That there is considerable give to it is well known, and that its contracting and expanding properties are to be given free play is not to be argued. Anything that retards this free expansion and contraction is, of course, unfavorable to the health of the frog, and contracted heels is the usual result.

In its natural state, that of freely bearing on the ground, the frog expands and contracts, grows freely, and keeps the general foot in good health. When, however, the frog is lifted from the ground by high heel calks, or by what is much worse, frog paring, the frog receives no pressure and consequently contracts. The frog in its natural office of expansion, presses the side walls at the back outward and thus expands the foot at the heels. When no pressure is placed upon the frog, these walls naturally press inward toward the center of the foot. And where the pressure is delayed too long, as in the case of high heel-calks, the result is contracted heels.

The shoer who cuts the frog of the horse's foot should either get out of the trade or study the anatomy of the horse's foot. There is no excuse for this evil, and no horseshoer worthy of the name should be guilty of such ignorant practice.

The Relation of the Foot Bones to the Exterior of the Foot.

W. O. JULIUS.

The bones of the foot and their relative position as to the exterior of the foot should be thoroughly familiar to the shoer and farrier. The practical horseshoer will spend his time well to study the accompanying engraving, showing the bones of the lower limb and their relation to the exterior of the foot.

The bone shown inside of the hoof is called the pedal bone. Above this is the short pastern, and next the long pastern. Above the long pastern is shown the lower end of the cannon bone, and at the juncture of the cannon bone and the long pastern and at the back are two small bones known as the sesemoid bones.

The special office of the foot is, of course, to support the weight of the animal. The horse at rest and standing squarely upon each of his four feet, places his weight principally on the outer edge of the hoof wall. The sole under normal conditions and because of its arched form, does not directly sustain any weight, although pressure is indirectly transmitted to it by means of the wall. If the sole be unduly thin, instead of supporting the limb above it, it yields to the pressure imposed upon it and injury naturally results. It is therefore unnatural to impose weight or undue pressure upon the sole. And except under diseased conditions, the natural arch of the sole must not be forced to take a bearing. Under conditions of disease or injury the sole may be brought to bear a portion of the animal's weight by removing the shoes and allowing the animal to graze on soft turf, or stabling him on sawdust or other soft yielding substance.



THE FOOT OF THE HORSE SHOWING THE BONES

It is, of course, fully understood that the frog is ground bearing, or rather should be. In fact the frog bearing on the ground has much to do with the healthy growth of the foot. The frog does not, however, bear weight the same as the wall. When weight is imposed upon the frog, the latter, being of soft yielding substance, recedes and leaves the bulk of the weight on the wall and on the bars.

In the process of travel, the foot is repeatedly raised—the weight taken off—and replaced on the ground and



CARMON, THE FIRST SIRE SELECTED FOR USE IN EXPERIMENTS TO DEVELOP AN AMERICAN BREED OF CARRIAGE HORSES

the weight again imposed. Wall, sole, and frog have each a share in this process—each support a portion of the weight. But the function of each is different and the way in which the weight is supported differs according to the function. The shoer, to understand the principles of shoeing must understand these functions. He should know the office of the frog, the sole and the wall, how these three perform their offices, how, in cases of disease or injury to one of them, the others can be made to take its work—to what extent this can be done. And only by a study of the foot and the functions of its members can these matters be determined and thoroughly understood.

In examining the foot of the horse even casually, we cannot help but wonder how well adapted it is for just the conditions it has to meet. The heel of the foot we find has a soft cushion,

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the frog. This because of the fact that the heel touches the ground first when the animal places his foot on the ground. The frog cushion naturally lessens shock, and with the other elastic structures of the foot provides a means for avoiding concussion.

The toe we find also very well adapted to its special office. The hoof wall is thinnest at the sides and thickest at the heels and toe. In being placed on the ground the back part of the foot meets the ground first. The middle portion of the hoof wall next, and last the toe. After the toe touches the ground, the horse starts to raise the foot, and naturally the part of the foot to leave the ground last is the part that receives the final thrust or push to carry the horse forward. This part is, of course, the toe. This part of the foot, as spoken of before, is structurally well adapted for this use, in that it is the thickest and strongest part of the hoof wall, and contains the pedal bone as an inside base.

In summing up our analysis we find strength and inflexibility at the toe of the foot, while at the heels we have strength with elasticity. It is the shoer's business to see that these same principles are followed in shoeing. The preservation of the natural functions of the foot and limb is of extreme importance to the foot health of the animal.

An American Breed of Carriage Horses.

SPURFOOT.

Uncle Sam's Department of Agriculture decided some time ago to develop a breed of carriage horses on an American foundation, and after a thorough search purchased as foundation stock eighteen mares and one stallion. In addition, other stallions



CHESTNUT MARE "DAKOTA"

of good standing are at command. In choosing the foundation of this new carriage breed to be, life, spirit, and energy were considered most essential and given most attention.



CHESTNUT MARE "INDIANA"

The mares were purchased in Wyoming, where their ancestors have been bred for five or six generations, the band being started by means of an importation of horses from the central West, which consisted mostly of Morgan stock. Thoroughbred and standard sires have developed this herd more for carriage purposes than for speed. Some of these mares have been exhibited at the New York Horse Show.

The search for a stallion to head this stud was more difficult. Trotting horses of almost unlimited number were recommended, but choice finally centered on a horse first suggested: Carmon, 16 hands, 1,200 pounds, black points, with no white markings. This horse was bred by Hon. Norman J. Colman of St. Louis, and was exhibited by Mr. Thomas W. Lawson of copper fame as one of his famous four-in-hand, under the name of "Glorious Thundercloud."

The points of Carmon's conformation which deserve special mention are his head, neck, and hind quarters. The forehead is broad and full, with a straight nose and face; full, expressive eyes and well carried ears. His neck is clean, muscular, and well arched. In the hind quarters special attention is directed to the straight broad croup, and the muscular quarters, and lower thighs. The horse has an abundance of bone and substance, but plenty of quality at the same time. His action is excellent.

A study of Carmon's pedigree shows nothing particularly fashionable to the breeder for speed solely. But it shows a line of ancestors from which one might expect a horse of excellent conformation. The blood of Morgan, Mambrino Chief, and Clay—which families have produced some of our handsomest horses—makes up nineteen sixty-fourths of Carmon's pedigree.

The most rigid selection is practiced in the management of this stud and no animals are retained for breeding that do not conform to the high standard set by the Department.

Thornton's Letters.—8.

Being "Straight-from-the-shoulder" Talk from a Prosperous Self-made Smith to his Former Apprentice, now in Business.

DEAR JIM:

Don't you do it for one minute. I wrote you about this very thing in February. And I reply to yours of recent date right away for fear you've cut down your schedule. Now don't do it under any circumstances. If your competitors want to give stuff away, let them do it—but you hang on to your prices no matter what happens. That place you're in now isn't the only town on the map. And if you can't get a fair price for work, better do as lots of people do on May first—move.



BAY MARE "WISCONSIN QUEEN"

I saw this very thing coming—that's why I wrote you in February. You've gone after business so strong—so persistently— so vigorously, that the other fellow simply must do something to hold trade. He figures that price is the thing that appeals most to the customer. And it is, Jim, you know it is. But when a man finds that a price of 98 cents is for 97-cent work, he'll soon call 'round and pay a dollar for work that's fully worth it.

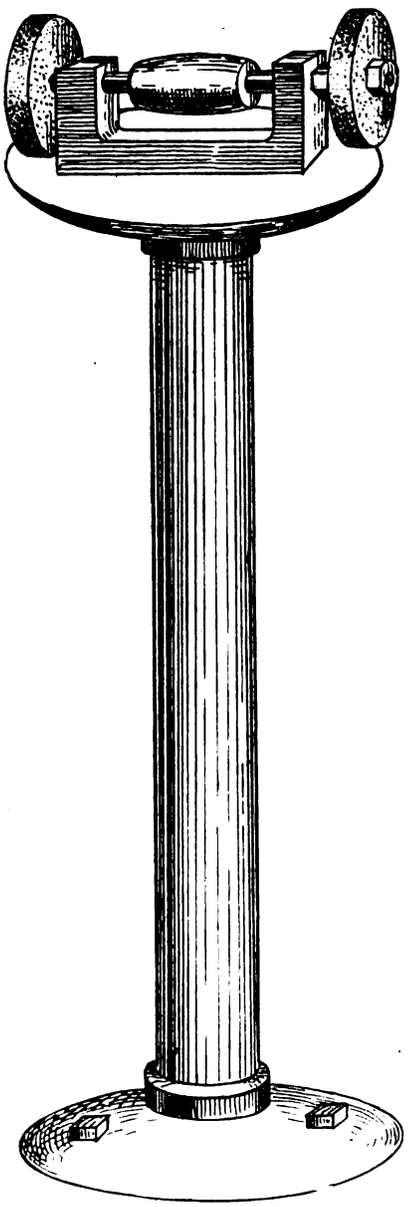
When you located up there, Jim, I told you to talk quality first—price afterward. Keep quality at the big front door of your shop, as it were, and price back in the rear with the scrap pile. I believe you've done this, Jim, and that's why the other chaps are after your scalp with a price tomahawk. But just mind what I say, old man—keep your prices just where they are. Raise them if anything, and show your competitors that they can't bully you one bit. In the meantime, talk quality. Get out some neat circulars on quality—let the people know that you are the best workman in town—show them in every possible way that quality counts

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and that best quality and Jim's shop mean the same thing.

Yes, Jim, there's lots of talk and gassing about "price arguments." And they're all right—when there are no other arguments. But you try quality arguments and if you don't win out, I'll buy you a new hat with shoes for the baby thrown in.

Fooling the people on price arguments is like sneaking an unstamped letter into the mailbox after the postman has gone by. It'll be found out on the next trip. Figure it out on this line, Jim. You wouldn't buy a gold brick after you'd been put next. Well, don't think



AN EASILY MADE AND SERVICEABLE EMERY STAND

that the people you sell to aren't as wise as you are. It's a bad day when a smith tries to sell bum work at a bum price—that is, it's a bum day for the bum smith. If a competitor wants to cater to cheap trade, let him cater all he wants to. You don't want all the trade—all you want is all you can get. That's business. And if you shout quality you can't get the cheap trade unless you go to the expense of educating them to the quality idea.

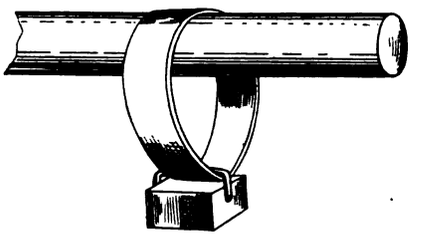
Yes, suppose your competitor is turning out as good work as you are, but at a lower price. Suppose he is. You can buy just as cheap as he can, and perhaps a little cheaper. If the other fellow takes it into his head to sell at cost, he'll not last long no matter what his resources are. A business can't be run long at a loss.

You say that your profits are now too low. All the more reason for putting them up—up where you can put money in the bank and discount your bills. Why this price-cutting business is the best thing in the world for you—and the worst move your competitors could make if they're trying to fight you. Now don't get afraid of the cars. Keep a stiff upper lip, a level head and keep quality always in sight. Get that gas engine right away if you haven't it yet. It may solve this price-cutting business without an effort. And right here are other talking points for you—up-to-date equipment, prompt deliveries and quality workmanship.

Yes, I've gone fussy over quality—you know what the word means at this shop. It's everything and all else is figured on that basis. Deliveries are made promptly consistent with quality. Prices are reasonable, consistent with quality. Everything in or about the shop is modified by quality. And when people want quality goods, workmanship and repairs, they know where to come. This price fight of your competitor is just the thing to bring out your quality in contrast. Put as much meaning as you can into the word quality, and then shape things so that when people think of quality—when they read about it—speak of it—or hear of it, they will think of Jim's Quality Shop. You can do it, Jim, and don't be tardy about asking me for help.

I've written a pretty long letter on the sermon order, but I think you'll catch what I mean. I don't want you to be a Tom Tardy and cut prices because the other fellows do. And right here I want to give you a little tip. I started in the very same shop old Tardy is in now. I got after business very brisk, but when the other fellows cut prices to get me out, I just hollered quality, put in power, and turned on steam full head. Tom dropped prices when his competitors did, has been dropping ever since, and is expected to drop out of business any day.

I just mention these things, Jim, so you'll understand I want your shop to be



A SIMPLE DEVICE TO CLEAN THE SHAFTING

the best in Boyd county and one of the most prosperous in your state. All this talk adds up to: Fight their price arguments with arguments of quality.

Yours for quality,

Thornton

How to Make an Emery Stand.

D. FOSTER HALL.

An emery stand that has at least one advantage over the regular stand is very simply made, as shown in the engraving. Any practical smith can make a stand of this kind in a very short time, and will find it thoroughly practical. Take a piece of 4-inch steam pipe, about 30 inches long, with thread on each end, then screw a 4-inch pipe flange on each end, and you will have a simple and strong stand. This stand is much better than an ordinary one for blacksmith's use, as it occupies but little space and one can work from any side of it on different kinds of work. The upper flange can be drilled to suit head and rests, and the lower one with four drilled holes for four half-inch lag screws for fastening to floor. The accompanying engraving will show how it will be when finished. This stand can be constructed very cheaply, especially in a general shop, where the entire material may be found in the scrap heap.

Keeping the Shafting Clean.

C. R. CARRINGTON.

The shafting in the modern and rightly-kept smith shop presents a cleaning problem that few smiths care to tackle. My shafting cleans itself, however, and so this problem bothers me little. I noticed that one of the boys has his bicycle fitted with little straps on the wheel hubs to keep them bright. Why not the same kink for cleaning the shop shafting? I secured

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a piece of soft leather, and after cutting it the right length, hung it on one of the shafts and sewed the end together. I then took a small piece of iron and fastened it securely to this little belt and set the machinery. The way that little strap went about the business of cleaning the shaft was wonderful. It hustled back and forth between the pulleys and had the shaft bright and clean in no time.

I accordingly fitted up all my shafting in the same way, placing a strap with a little weight on it between every two pulleys. Of course, one must use care to get the strap long enough so it will not turn round with the shaft, and short enough so as not to get caught in the belts. The weight should be simply sufficient to keep the strap from turning on the shaft. A heavy weight will cause the strap to wear quickly.

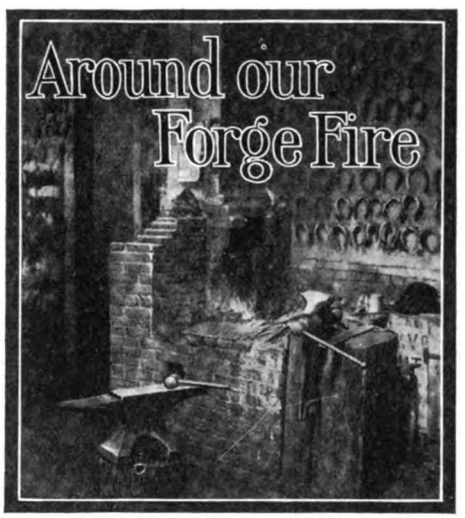
The Need of Organization in the Smith Craft—2.

JOHN WARNER.

Number two starts in a town ten miles from the first one. Using better judgment he establishes a price of $10.00 a day for himself and helper. He charges $3.00 a set for setting buggy tires and $1.50 each for pointed plowshares, while the first charged $2.00 a set for tires and 75 cents apiece for shares. We are going to allow that the quality of the work done by both shops is about equal. Number two, however, has a helper, and in consequence can get out the work quicker, but his helper must be paid out of the output. Number three starts up three miles from each of the others, and a three-cornered fight is on. On prices he falls in somewhere between the two extremes. He points shares for $1.00 and sets tires for $2.50 a set. Anyone with the commonest kind of sense ought to know there is something wrong somewhere concerning these extreme differences in prices. To add still further to the inexcusable condition of affairs, one of these shops does a well-known job of work for 75 cents and the other one will charge $1.50 for the identical job. Now, to cap the climax, the same is reversed, and the shop which gets double price on one well-known job gets just half price on some other job. Let us look for the result.

There is almost everywhere a class or element that is always looking for cheaper work. In taking their work from one shop to another they become aware of the differences in prices. They find that they get a certain piece of work done at one place for 75 cents and in the other town the piece of work costs them $1.50. These people not only go where they can get their jobs cheap, but they tell everybody else about it.

In due time all the shops make a discovery. They all learn that the reason they do not get many certain jobs is that their competitor does that work for half price. What is the consequence? Why, to come down to the other man's prices, of course. Some may say I have carried these illustrations to the extreme. If you think so, I will furnish proof. Such a state of affairs exists in communities without number, and the shops are injured every time. Prices, like water, will find a common level.



"Does horseshoeing in other countries differ from the practice here?" Benton was the questioner, and he was comfortably seated in his usual chair near the Editor's "forge."

"It does, in a way," replied the Editor. "For instance, in South Africa there is little or no need for calks. The same is true of Australia and all countries of milder climate than our own. Of course, there are exceptions when the country is hilly. But as a general thing, horses in countries of little snow and ice are shod with flat plates."

"In other respects does the practice differ?" questioned the other.

"I don't see how it can," returned the Editor. "A horse's foot in the United States is a horse's foot in Australia. The same bones, ligaments, and tissues are there, and if the shoeing is based on anatomy, as it should be, there cannot be any very material difference in the shoeing. Of course shoes will differ in shape, design and the like, but for the actual principles upon which the art is based, these must be the same."

"How do you find American smithing ideas take among your foreign readers?" queried the other.

"The foreign readers of the paper are strong in their praise of our methods, and most every steamer mail brings requests for back copies, prices on supplies and other information," replied the Editor. "I am very much pleased with the way our foreign brothers have responded with their subscriptions. They have been sending them right loyally."

"Do American forging methods differ from those of England or other foreign countries?"

"They do, but very slightly;" returned the Editor. "Their methods are practically the same, while the names of various operations are slightly different. For instance, what is known here as welding is called 'shutting' in England, and what is here known as drawing out or drawing down is called 'cogging' across the ocean. But in general the methods and practices of the foreign smith are the same as his American brothers."

Tompkins, the horseshoer, made his appearance at this point. "Say, Mr. Editor," said he, "Can I get a print of the skeleton that appeared in the May paper? That skeleton of a horse is just what I want."

"Certainly you can get one," replied the Editor. "By the way, how are things down your way?"

"Well, we can't complain," returned the other. "We have all we can take care of and look for a good, brisk trade right through the summer."

"Business seems to be generally good all around," put in Benton. "I was down Hampton way last week and found very few smiths idle. There seems to be a rush of trade all along the line."

"Oh! say, Benton," exclaimed the shoer, "I want to know if it's possible to heat iron in water. A chap came round the other day and said that it was possible."

"Why, it can be done," replied Benton. "But it's not quite as you state it. You see the thing works more on the principles of electricity."

"How is it done?" asked the other.

"Well, you fill a lead-lined porcelain container with acidified water and connect a strong positive conductor to it. A pair of tongs with insulated handles is then attached to a flexible negative conductor. You now plunge your iron into the water and manipulate it with the insulated tongs. Immediately the water is agitated by a boiling motion and the iron is brought first to a red and then to a white heat. This action takes place so quickly that the end of the iron not immersed is but slightly warm."

"Well, that's something new to me," said the shoer. "I thought the chap was stretching a story."

"It's the great resistance created in the water that heats the iron so quickly," said Benton.

"I've got to see my dealer and catch that next train for home, so I'll trot along if you've got that picture."

"All ready for you," replied the Editor. "Drop in again when you're in town."

"Tompkins has a very up-to-date shop," said Benton, after the shoer had gone. "I've been out his way several times, and he is certainly right up to the minute."

"He appears like a thorough business man," returned the Editor, "reminds one very much of Thornton. And I understand that his neighbors are about the same."

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Your Friend and Mine.

HUGH MACNEILL KENDALL.

Who stands beside as we delve or build,
To whom must we turn for aid
When the earth is tilled or the mine is drilled
Or the corner-stone is laid?

Who fashions the rail and the whirling wheel
Where the flying train shall glide,
And shapes the steel of the warship's keel
And the armor for her side?

Who makes the axe and the sword and share
And the surgeon's lancet, keen?
Who forges there in the furnace glare
The soul of the huge machine?

'Tis the smith—the master of bar and blade,
Of mighty brawn and bone.
The tools he made for every trade—
His brother's and his own.

Written expressly for THE AMERICAN BLACKSMITH.



Don't, when you don't know how.

Much safer to clean the engine when it's not working.

The smith who takes business easy doesn't see very much of it.

Be a head ahead of competition. When you follow you are always behind.

Some smiths lose both, in trying to keep track of their business in their head.

Some men know as much about their wants as a dog does about the head of his bed.

What do you do? Lots and lots of smiths find good extra profit in a side-line.

The old and the new, both are necessary when advising us of your changed address.

Brighten things up a bit with a pot of paint. Shop and sign—perhaps both need it.

"This is my side-line"—writes a smith, calling attention to his card as Justice-of-Peace.

Patience is an excellent quality in man, provided he doesn't allow it to become indolence.

Anyone can turn the blower handle, but it takes a wise man to work the steel at the fire.

The busy man is seldom the quarrelsome one, yet the quarrelsome one is generally busy.

"Be sure you're right and then—" but don't study the time table too long, or you'll miss the train.

Improvement is inevitable to the man who does his best each day. Count each day a little life.

We all make mistakes sometimes, but don't make the mistake of making mistakes all the time.

Ventilation near the floor line will improve the general safety of the engine room. Know why?

That box of sand placed in your engine room yet? It may affect your insurance premium favorably.

A paying investment is our life subscription rate. Shall we quote? Its low figure will surprise you.

They'll care for you if you care for them. Account books are books of account in a business of account.

Worth doing well is the job worth doing at all. Advertise yourself by being known as a first-class workman.

Worth its weight in gold, and one-third more is pure platinum. Are you worth your weight in platinum?

If you don't know, try. And then read THE AMERICAN BLACKSMITH. Chances are you'll do it, and right, too.

Use your brain, and figure out some things yourself. Don't continually ask others to figure things for you.

When in doubt—when you forget—read THE AMERICAN BLACKSMITH, and tell your neighbor to do the same.

Timely Talks with Subscribers—do you read them? Something of interest to you in those columns every month.

One every month for one year for one dollar—tell your neighbor. Call on him now with a copy of "Our Journal."

The more we know the larger our world. And the larger our world, the larger we are in it. Knowledge is truly power.

Don't always blame the price end of a job for the customer's failure to appear again. Quality is more often the deciding point.

Why not get him today? If you will do it, and all our readers do it the fifty thousand will be sure. Don't forget—today.

Never growls—never strikes—never asks for a raise—does the gas engine. Let the wheels of one turn the dollars into your pocket.

The far-sighted manufacturer will not recommend his machine for certain work until he knows positively that the machine can do it.

Ever pinch your feet in narrow shoes? Remember how you felt? Think how the horse feels when you shoe him with narrow shoes.

"One—man's—loss—is—another's—gain," said Tom Tardy between puffs, looking at the long line of horses before the shop down the block.

More popular than ever are rubber tires. Are you ready to care for your share of this business? Get busy now—new catalogues are out.

Heard from your herd, have they? Stick a member of the pink buffalo strain on every letter you write to advertisers and brother craftsmen.

Right now is the time to organize—to send in that new subscriber—to add that side line. No time like the present to do things. Do it **now**.

Live up to your advertising—it gains confidence, and that means more business. When you advertise something, do that something as advertised.

Ever hear of anybody stumbling into the valley of success? Not by a long shot—success is a mountain peak, and it's fight every inch of the way to the top.

A South African farm where 5,000 chicks are incubated weekly was established by a Kansas poultryman, and is one of the largest poultry farms in existence.

Some smiths seem to forget that their trade is a business, and must be run on business principles. Be a business smith and you will be a smith with business.

Pick out a side-line now. Summer usually finds the smith with spare time, and there's any number of extra-profit opportunities presented in our advertising columns.

Three hundred thousand pounds and above is often the tensile strength per square inch of steel piano wire. 'Tis believed to be the strongest known substance.

Sure you've read the paper from cover to cover? Did you read Brother Ed. Barnard's letter about "A Successful York State Shop"? Read it again and—tell your neighbor.

Be alive to your business and keep your business alive. Boost if business is slow. Careful, powerful, persistent, intelligent pushing will place your business where you want it.

It doesn't pay and never will. Fair profits spell success—cut prices mean ruin. Common sense in business means common cents in profit. Again we say, price cutting will never pay.

Some smiths know poor work is profitless, but like Tom Tardy they go on, year in and year out, disregarding past experiences, and then wonder why success is not for them.

A well known advertiser uses the figure of a blacksmith to illustrate "The Man of Power." And what other craftsmen would he use, brothers? Who else would do for **the** man of power?

The trained ear will readily detect any derangement in the shop machinery. Get the normal tone of your engine well seated in your ear, and its unusual voice will be readily apparent.

Things worth having don't come without effort. We must push for more trade, hustle for outstanding accounts, work for comfort and happiness. Pay is required for every desirable thing.

"Always something to fix," said friend Tardy while at work on his old chair. "Seem's though I no sooner get this chair fixed and it breaks." Ever try not using it, Tom? It's worth tryin'.

Determination to hang on counts for more than the particular hold you get. A tail hold is not near so dangerous as taking the bull by the horns. And you'll travel as fast, and most as far.

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"The very foundation of business is to make money—I can't possibly understand how a man can become so near-sighted in a business way as to cut profits to almost nothing," said Thornton, when talking about price cutting.

"What he does in spare time tells what he'll be at forty." It's his use of time after the six o'clock whistle—not that before—which determines the young man's future. Tell the apprentice. Encourage him to invest his after-six hours for the future.

Snow will fly again in seven or eight months, but don't wait until then to call the first meeting of that association. Write for plans right now—now when roads are good, trade good and conditions right. The secretary waits your request for plans.

Alive all the time is competition—seems to work while you sleep. And live competition will skin you alive if you're not alive every minute. Tackle the competition bugbear in front or behind—but tackle it and keep persistently tackling it until you're so far ahead of it that it's up to the other fellow.

Fifty thousand will quickly be our number if every present reader hustles while we get it. Talk AMERICAN BLACKSMITH to your neighbor smiths until you land every one of them as a subscriber. We make it worth your while—ask us.

"Say there, old man, 'bout time you disappeared isn't it?" said the forge to the big hole in the roof. "I've been here most as long as you have," replied the other, "and I guess there's no danger of me goin' before you do." Just then a customer came in and awoke the smith with a loud "Hello, there, Tardy, old boy, asleep again?"

American Association of Blacksmiths and Horseshoers.

The association movement is gaining supporters and enthusiasts daily. Counties in all sections and states are flocking to the standard. But, Mr. Reader, this is not doing your county a speck of good. It's not raising your prices, protecting you against the "dead beat," or bringing the brothers of your county into harmony. To reap the harvest of good things, you must sow the seeds of organization right in your own county. Coöperation—a good pull, a strong pull, and a pull all together is the result maker.

Have you approached your brother smiths on this organization question? Do you know how they stand on the association platform? Suppose you approach them on the subject today, now, right away. Don't say you haven't time—that's what you've been saying for months past—that's why you haven't the protection of an association in your county now. Look the matter square in the eye now—now, when you have the matter fresh in mind. I offer to help you at every possible turn. Won't you help yourself? It's simply a question of writing for my easy plans and getting things going in your county. You will find it easy rowing after the boat is under way. It means a good, strong effort at the beginning, but when once well started, things will take care of themselves.

Read what one staunch smith says about organization:

I would like to read at least a few articles or testimonials in THE AMERICAN BLACKSMITH from places that are organizing. We have a local here and the advance profits to me in getting more for our work and collecting bad debts has amounted to about two thousand dollars in the last year. Every blacksmith in the U. S. should belong to an association. F. W. CLAUSON.

Now don't let another day pass without letting me hear from you on this matter. The association movement is gaining headway every day, but we want your help, and the help of every other loyal sturdy smith. We want you to enter the ranks with the determination that nothing will stop us this side of a strong, perpetual, national association.

Let me hear from you today. The coming summer is a most opportune time to "tease up" an association, and I want to see you well taken care of before the fall rush begins—before the winds of winter again find you with low prices, strife and misunderstanding. Costs have raised considerably all along the line, brother. Have you raised your prices to customers? Costs aren't likely to drop, but everything tends to the idea of advance and unless you get more for your work soon, you'll find yourself without profit and perhaps working at a loss.

Now, brother, organization won't turn the shop into a gold mine. But it will give and is giving the smith what he deserves—a fair return for his work—a better standing in his community—an association with which to fight unfavorable craft competition. But the results of organization are without number. Associations as a rule find situation after situation for bettering, and there is almost no limit to the many favorable conditions which the association can bring about. So let us join hands, Mr. Reader, for the betterment of the craft. Address me today, P. O. Box 974, Buffalo, N. Y., and by return mail will come plans so simple, so easy as to pleasantly surprise you. THE SECRETARY.

Welding Automobile Parts.

E. F. LAKE.

Many different parts of the automobile require high grade steel to withstand the strains and stresses to which they are put by the racking and twisting of the car in traveling over rough country roads, and as many of these parts are too intricate, in shape to be made out of the standard rolling mill shapes, they are usually produced by forging. Many of these forgings are of such a size and shape that they cannot be forged economically in one piece, therefore, they are forged in two pieces and welded. These parts have been the source of considerable trouble to automobile manufacturers, owing to the necessity of making them as light as possible, so that a large part of the engine energy will not be taken up in moving weight and but little left to drive the car. While the average smith prides himself on his ability to make welds and feels highly offended if you question the strength of the metal at the weld, it is nevertheless a fact that many of these welds give way and in a few cases cause serious damage to the motor car and its occupants.

In manufacturing the parts which require welding, it has been found almost impossible to make them as strong at the weld as at other points, unless they are made in a much heavier section at this point. This increase in size of course adds to the weight, which must be kept down to the minimum consistent with strength. There are two processes of welding that are in common use at the present time, on this class of work, one being the hand welding which is done by the smith with his forge, anvil and hammer. The other is the electrical welding process, which is admitted to have many material advantages over the old way, in that, heating may be located in the immediate vicinity of the points which are to be welded and the temperature is always under instant electric control, thus largely reducing the tendency to overheat or burn the metal.

Another process has been brought out and perfected in Europe and is used quite extensively in France, for welding sheet metal. This is the oxy-hydrogen blow pipe. By the combustion of two parts of hydrogen and one part of oxygen a theoretical temperature of 12,000 degrees Fahrenheit was produced. In actual practice, however, this temperature was only 4,300 degrees, owing to the disassociation of the water vapor and to produce a flame with a reducing action, it was necessary to use four parts of hydrogen to one part oxygen, which reduced the temperature to 3,400 degrees Fahrenheit. The hottest part of the flame was ⅜ of an inch from the end of

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the burner, and by passing this slowly along the joint, the iron would be melted and run together forming a weld. Rust would make no difference with this process as it was reduced by the melting process. The cost of labor and material was 7 cents per running foot for sheets $\frac{1}{8}$ of an inch thick and 8 cents per foot when the thickness was increased to $\frac{3}{8}$ of an inch. This process was improved by the adoption of acetylene in place of hydrogen, as acetylene gas is cheaper and its flame is of a much higher temperature. This is used by means of the oxy-acetylene blow pipe by combining one part of acetylene gas with one and $\frac{7}{10}$ parts of oxygen with the result that 4,200 degrees of temperature, Fahrenheit, is obtained, thus enabling much thicker metal to be welded with a strength at the seam of 90 per cent of that of the regular section.

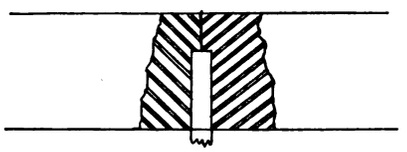


FIG. 1—A COLD BAR DRIVEN INTO THE TWO HEATED ENDS WILL NEVER MAKE A SATISFACTORY JOINT

By this process iron, steel, brass, copper, etc., can be successfully welded, but cast iron would have to be brazed with copper.

There are many objections to welds in the alloyed steels used for such parts of the automobile as I beam or tubular axles, distance rods, which connect the steering mechanism between the two front wheels, levers, steering arms, cardon shafts, etc. But the expense of forging these without welds is too great and the efficiency of the weld is largely governed by the composition of the metal. Thus, with some steels the smith may be able to make almost perfect welds, while with others the weld may look all right and yet when put to the test of actual use, it will give way. The perfect weld, however, is impossible to obtain, as is best illustrated by the machinist cutting a notch in a bar of steel to break it. The bar always breaks at the notch because the stresses are concentrated at this point, instead of being spread out uniformly. Likewise there will be some particles of the metal which will not adhere and join together. If these do not show on the outside of the metal, they will be present in the core, and the stresses will concentrate at this point. Thus, welds with 75% efficiency are considered good ones.

Steel with a carbon content of 15% must be handled with care and it is difficult to make a weld in this that is much over 50% of the strength of the unwelded section, while with 20% carbon, welds are entirely unreliable

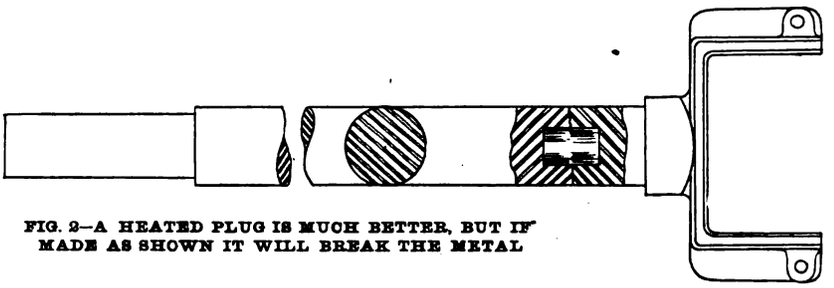


FIG. 2—A HEATED PLUG IS MUCH BETTER, BUT IF MADE AS SHOWN IT WILL BREAK THE METAL

and seldom show over 35% of the strength of the unwelded section. With 40% carbon welds are not to be thought of, as the steel is subject to crystallization at a temperature much below one which renders cementing possible. Other components of steel such as nickel, tungsten, vanadium, chromium, aluminum, manganese, copper, tin and zinc tend to work against the possibility of making good welds and these alloyed steels are classed as non-weldable.

Thus different methods are resorted to by the blacksmith to make the welds more secure, some of which aid in strengthening it, while others are absolutely useless. Fig. 1 illustrates one of the latter and is one that I have seen a smith make in actual practice. The two pieces were heated and held together by clamping them, then a cold bar was driven into the hot metal at the joint and this hammered until it gripped the plug and joined together around it.

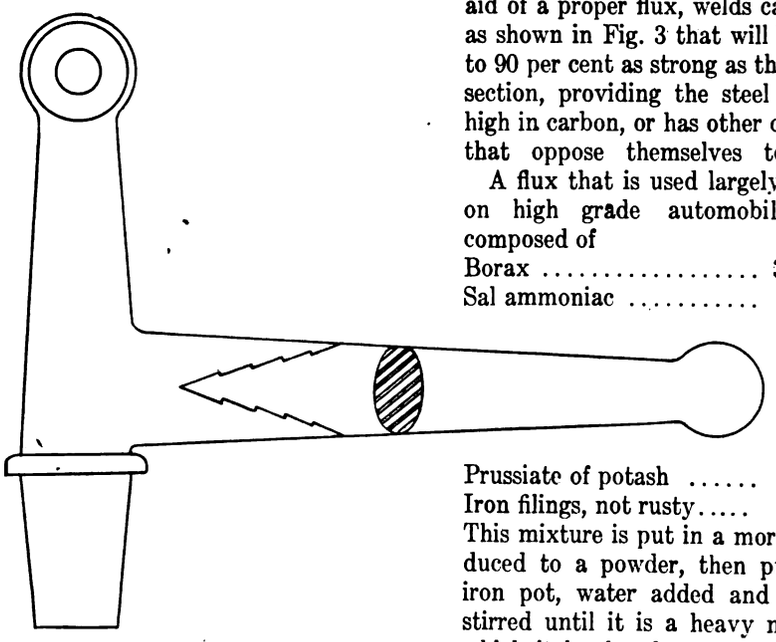


FIG. 3—AN EXCELLENT WELD FOR USE ON AUTOMOBILE PARTS

But how any smith can stretch his mechanical ability to a point where he will imagine that a cold bar will weld to hot metal is beyond my knowledge. This was only called a weld, as the cold bar would weaken the joint instead of making the joint stronger. Fig. 2 illustrates another kind, but in this case a short plug was used and imbedded in the metal. The plug was brought to the same welding heat as the parts to be welded and was therefore that much better, but it would leave a break in the metal at each end of the plug, which would make it weaker at this point than in the unwelded section, even though it acts as a coupling to the two parts welded. This style of weld goes to prove that the smith has no faith in his own welds no matter how much he may claim to be able to make a perfect one, as by beveling the two ends and then welding them together, would make a much stronger joint than this style and probably an easier one to make. Fig. 3 illustrates what is called the sharks grip weld and is the best style that can be used whenever it is possible to use it, as the metal of the two parts interlock with each other and it has a gripping effect even though the metal may not unite perfectly at the weld. With the aid of a proper flux, welds can be made as shown in Fig. 3 that will be from 75 to 90 per cent as strong as the unwelded section, providing the steel is not too high in carbon, or has other components that oppose themselves to welding.

A flux that is used largely in France on high grade automobile work is composed of

Borax	30	ounces
Sal ammoniac	3	ounces
Prussiate of potash	3	ounces
Iron filings, not rusty	1	ounce

This mixture is put in a mortar and reduced to a powder, then put into an iron pot, water added and the whole stirred until it is a heavy mush, after which it is placed over a wood fire and constantly stirred until a material is obtained of the appearance of pumice stone, but with green and gray shades. This is then allowed to cool, when it is pulverized in a mortar and is ready to

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use by sprinkling over the pieces to be welded, while they are at the welding heat.

Phosphorus and sulphur are impurities that are higher in steel, as manufactured today, than they were in the puddle iron, which was so easily and successfully welded. The higher these are, the less value the steel has for automobile parts, which have to be welded, as the very parts which are the most difficult to produce without welds, are the ones which have to withstand the greatest strains, and if broken, are liable to cause the most serious accidents. Therefore it is imperative that these welds be made as strong as the skill, knowledge, ingenuity, and experience of the smith can make them, and this cannot be done unless he has the best of steels for this purpose and the best of tools and appliances and rigging to perform his part of the work.

4-25, '07

TIME CARD.

Herbert Chandler

ORDER NO.	NAME	FROM HR.	FROM M	TO HR	TO M.	REMARKS
19306	Bolton Tran. Co.	7	00	12	00	
"	" " "	1	00	3	40	
19307	Armour Pkg. Co.	3	40	4	35	
19311	Waterloo Cr'm'y	4	35	5	15	
19314	Brown Herley	5	15	6	00	

THE TIME CARD UPON WHICH THE WORKER KEEPS A RECORD OF HIS TIME

System in the Smith Shop.

NELS PETERSON.

So far as running the mechanical end of the shop is concerned, it would seem the system should be adjusted to meet the conditions of the shop and line of work done. Some good ideas may be gathered from the article in the April paper, entitled "The Smith Shop of Today and Tomorrow." In my 30 years' experience at the smith craft, I have worked in shops where only one or two men have been employed, and have had charge of smith shops with 50 to 60 men at work, and from two to three hundred in the factory. In the latter case a perfect system is of the utmost importance to produce results. Stock and equipment must be so placed as to avoid all unnecessary handling of work while in progress of construction. To do this, no return movements should be allowed, as it will result in confusion.

In the handling of men some judgment must be exercised as to who is most capable or best situated for performing a certain class of work. For instance, it would be showing poor judgment to ask a man at a small fire to weld a four-inch axle, when perhaps a man at the other end of the shop with a good trip hammer at hand and a larger fire could do the work in much less time.

Coming down to repair work in the carriage and wagon business. It would be poor economy to have the man at the fire take the work apart or put it together, when a helper who usually receives less pay can do it in just as short a time. It is usual in shops doing a large repair business to have two to three helpers for each smith, and he can keep them going, if he is any good.

With regard to keeping tab on the work being done—this ought to be a comparatively easy matter, and to show a system that is both accurate and effective in more ways than one, I show the two accompanying slips. One is a time card with the workman's name written at the top, on which the workman is required to keep his own time, as well as the amount of time spent on

ORIGINAL Order and Charge Slip

Fred Wagner & Son

CHARGE

Bolton Transfer Co.

Wagon No. 27

ORDER No. 19306

DATE 4-25, '07

ENTRY No.

BILLED AND ENTERED

two new hind tires, two front tires set; 5 new rims. and spokes as needed, new wood in endgate, rep. irons for same, two new brake shoes, shorten brake rods, 2 new leafs in right hind spring tighten up and put in new bolts in front gear as needed.

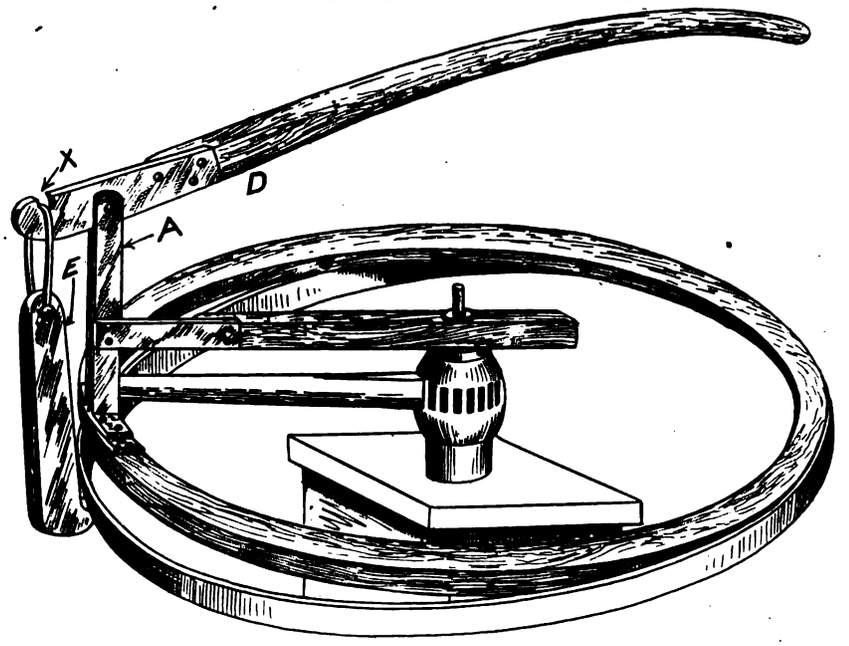
HR.	M.	WORKMAN	
7	40	H. C.	2 new tires 2½" x ¾" 180 lbs., 2 tires set, welding 2 hangers, 1 new endgate rod, 2 new leaves in spring 2½" x 5-16", 26 lbs., 2 new brake shoes, tightening front gear, 42 new bolts, welding 2 brake-rods.
		M. R.	5 new rims in wheels, 7 spokes and new wood for endgate.

Return this Slip to Office when Work is Completed.

THE CHARGE SLIP WHICH IS MADE OUT IN DUPLICATE AND FROM WHICH WORK IS CHARGED

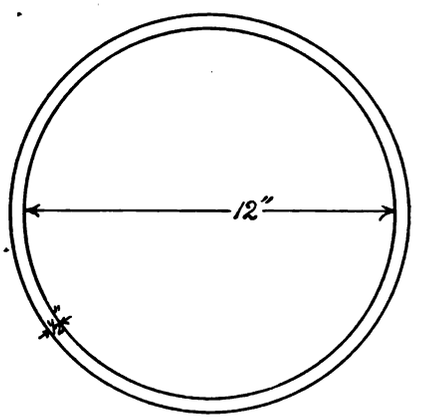
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each job he worked on during the day. A new time card is furnished him for each day. The other is a charge slip.



A SHOP-MADE TIRE-PULLER THAT ANY PRACTICAL SMITH CAN TURN OUT OF HIS SCRAP PILE

This is put up in book form and printed in duplicate. A job is taken in, the boss folds the leaf and inserts a carbon paper between the original and duplicate and writes out the work to be done on the job, as shown in the top lines. He then tears out the original, leaving the stub or duplicate in the book. The order is handed to the workmen who are to do the particular pieces of work, and when they finish they charge the time each of them has worked on the job. On the lower lines are put these items, the weight and the amount of stock used. The time consumed in doing it



HOW TO FIND THE AMOUNT OF STOCK FOR A RING OF GIVEN DIAMETER

is usually marked on the charge slip as well as the time card, the charge slip being returned to the office at once. On work to be charged the slip is left in the shop till quitting time. A heavy cardboard with a clip at the top for holding the papers is furnished. This board can be hung up to keep them from getting soiled or lost. With this arrangement, it is apparent that the boss can keep track of all work done, and more than that, he can tell who is doing the work and who is not, and of course treat them accordingly.

A Shop-Made Tire Puller.

E. A. BUZZELL.

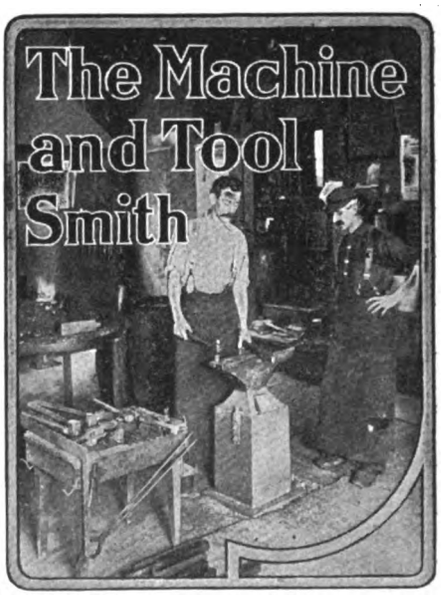
The accompanying engraving shows a very easily made tire puller that most any practical smith can turn out from his scrap pile. For the standard A take two pieces of 2 by ¼-inch shoe steel; bend them both so that when riveted together the lower ends will turn out as supports or feet. Now rivet a piece of 2 by ½-inch tire steel about 10 inches long on the bottom of the feet. Now rivet a piece of 2 by ⅜-inch shoe or tire steel. This piece should be about two feet long and high enough on the standard A to be on a level with the top of the hub. A piece of stout, stiff wood is now fastened onto this arm, so that a bolt can be passed through the wood and into the hub to hold the standard.

The lever D is made of a piece of steel or iron 2½ by ½ inches and about 2 feet long. To this is bolted a good stout piece of wood for a handle. The metal end of this lever is notched as shown at X. This notch is to receive a link and hook E. These should be forged last so as to get them the right length. In forging the hook, make it so that the point of the hook will not catch the rim of the wheel. In other words, make the offset just enough to catch the tire. For the hook use 2 by 4-inch steel or iron. The link may be made of ½-inch iron. The method of using this device is so very simple as to need no explanation.

Calculating Stock for Rings.

C. W. METCALF.

I will take for an example a ring of 12 inches diameter. If you want to make a band or hoop with a 12-inch diameter, you first figure the diameter by 3.1416, and then add three times the thickness of the stock used, and ¼ of an inch for the weld. You will now have it down to about $\frac{1}{32}$ of an inch, and that is close enough. This rule will work on any sized stock and any sized band. I have seen many different rules given, but find a good many of them failures. Some take the thickness of stock for welding, but ¼ inch is plenty for any sized stock. If you want to make a wagon tire multiply the diameter by 3.1416, and then add three times the thickness of stock, and nothing for the weld, and you have got ¼-inch draft on your tire, just what you want. A 12-inch diameter of ½-inch stock will take 3 feet 9½ inches. Remember this rule; it will save you lots of bother sometime, which may mean many dollars to you.



Wrench-Making with Modern Tools.

C. H. RICHARDSON.

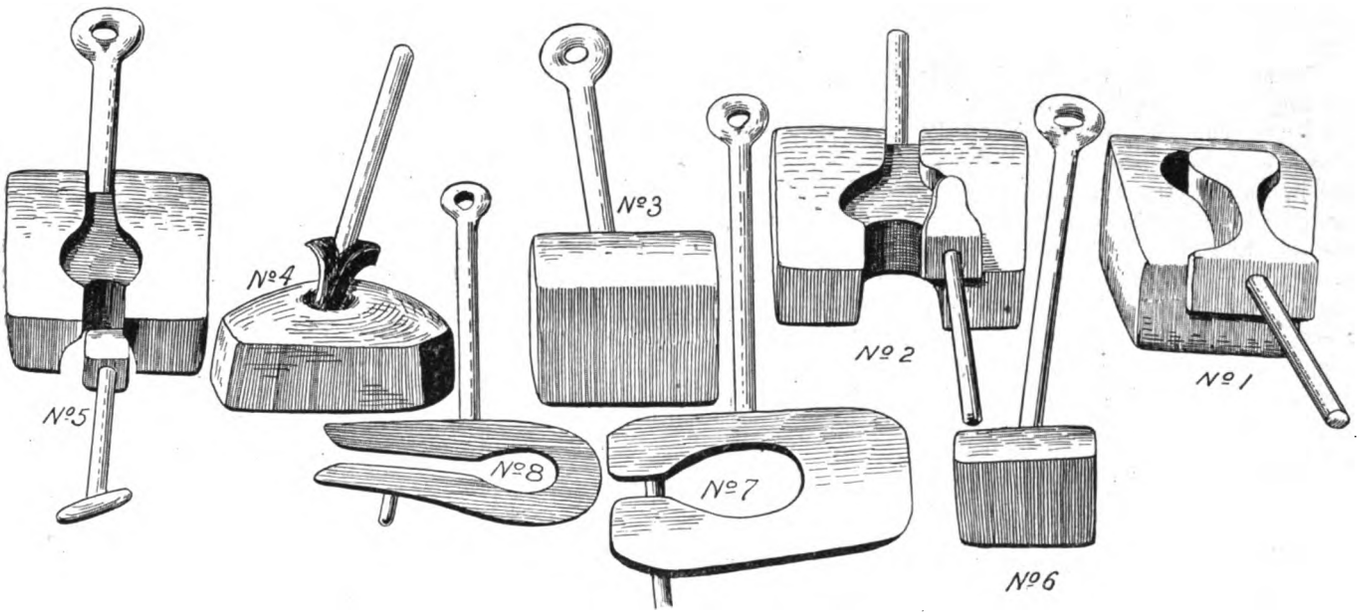
The photograph from which the accompanying engraving was made was taken in the tool-room of the blacksmith shop at the Fore River Engine Company, and shows two sets of tools for stamping

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out wrenches. The output of this set of tools is 45 finished wrenches per hour. This includes the time for cutting stock and preparing it for the furnace and stamping die.

Reading from left to right, we have at 1 the die that shapes the outside of the head of the wrench; No. 2 represents the tool for cutting out the inside or opening of the forging; No. 3 is a plain block of steel used as a peg or guard to prevent the hammer from driving the dies too close together, thus causing them to be hard to separate. If this tool were not used, No. 7 would be liable to break, because of being made only of light sheet steel, and it needs all protection possible. No. 7 is used to guide the punch through No.1. One great point about these tools is noticeable at No. 1, and that is the short distance from the outside edge of the head of the forging to the edge of the tool. Without the least trouble, double end wrenches can be made by simply reversing the blank that has been stamped out, the neck of the wrench being cut clean, it is very easy to figure the metal required between the heads of an "S" wrench. The blank is now placed in No. 2 and the jaw is cut out. This cutter works so clean that out of fifty wrench heads that had been blocked out there was not one that a one-inch nut would not fit nicely without filing. It will be noticed that No. 2 has no guard for the punch. It will also be noticed by a second look at the tool why the cutting edges are so well protected. The punch and die are so formed that just at the points of the jaws of the wrench the tools widen to very nearly the width of the wrench across the head and then run parallel to the edge of the die—about 2 inches. The cutting face of the punch is reduced once the thickness of the head of the wrench. This clearance is to allow the punch, when in place, to lay level, top and bottom, and still have enough of the straight part entered in the bottom tool to act as a guide. The operator when setting this style punch does not lay it on top, as in most cases, but pushes it in lengthwise. The shoulder of the parallel part presses against the points of the jaws-to-be, the hammer lightly pressing work in place and a single blow cuts the jaw of the forging clean or in other words, a perfect wrench in two blows of the steam hammer.

One might think this tool too expensive, but I have seen it keep three fires going, dressing off the handles and they were drawn and the edges swayed under the hammer also. The tools are made of 60-point carbon steel, and all cutting faces are case hardened after all machining is completed.



THE TOOLS ARE MADE OF 60-POINT CARBON STEEL, AND ALL CUTTING FACES ARE CASE-HARDENED AFTER BEING MACHINED

Method of Hardening Machined Novo Tools.

Milling Cutters, Taps, Reamers, Dies, Punches, Drills, etc. Not Lathe and Planer Tools.

A cylindrical gas furnace is used and a No. 20 Dixon Graphite Crucible is placed in the furnace by standing it on several halves of magnesia brick placed at the bottom of furnace. This allows a free circulation of heat around the crucible, giving a uniform temperature in the same and practically acts as a muffle in which the tools are hardened, and in this manner the tools will not come in contact with the direct flame of the furnace. The cover of the furnace is raised about one inch above the furnace top, allowing a free vent for the gas and heat which would otherwise be driven back into the top of the crucible, causing the tools to come out blistered and black and unsatisfactory in appearance.

The temperature of the furnace at the hardening point should be brought up to a full white heat, or a heat of about 2200° and all tools placed in this furnace for hardening should not be placed absolutely cold in the furnace but should first be preheated to a cherry-red heat and hung by heavy iron wires directly in the crucible. If the tool is not first preheated to a red heat, but hung entirely cold into the furnace, the intense white heat of the furnace will bake and blister the outside surface of the tool, while at the same time the white heat has not penetrated thoroughly through the tool, which is absolutely necessary for successful hardening.

The tool after being held the required length of time at this white heat, the time depending entirely upon the size of the tool, is, after it has reached a white heat through and through, submerged into thin fish oil or cottonseed oil, and left to thoroughly cool. The tool then comes out absolutely smooth, free from scale, and grayish in color, straight, true to size, and glass-hard.

On all Novo tools which have been hardened in the above manner, and which are glass-hard, it is well to relieve the hardening strain of the tools by placing the tool into hot oil, heated to the required degree necessary for drawing the temper of that particular class of tool.

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Any tools subjected to a blow or jar, such as all styles of punches and dies and pneumatic tools, only require a lemon heat for hardening, and the temper must be drawn to a deep blue, or about 550°, and the temper checked in oil.

Tools such as taps, threading dies, twist drills and reamers, subjected to a severe twisting strain, require a high lemon color heat, almost a white, and temper drawn to a deep blue or about 450°.

Milling cutters for very heavy roughing require a very high white heat in hardening, and the temper should be drawn to a very light straw, whereas milling cutters, forming cutters, screw machine tools, stationary shaping tools, and all tools for fine finishing work, and tools intended to keep a sharp edge, and where the strain is not very great, require a very high lemon, almost a white heat, in hardening, and temper need not be drawn.

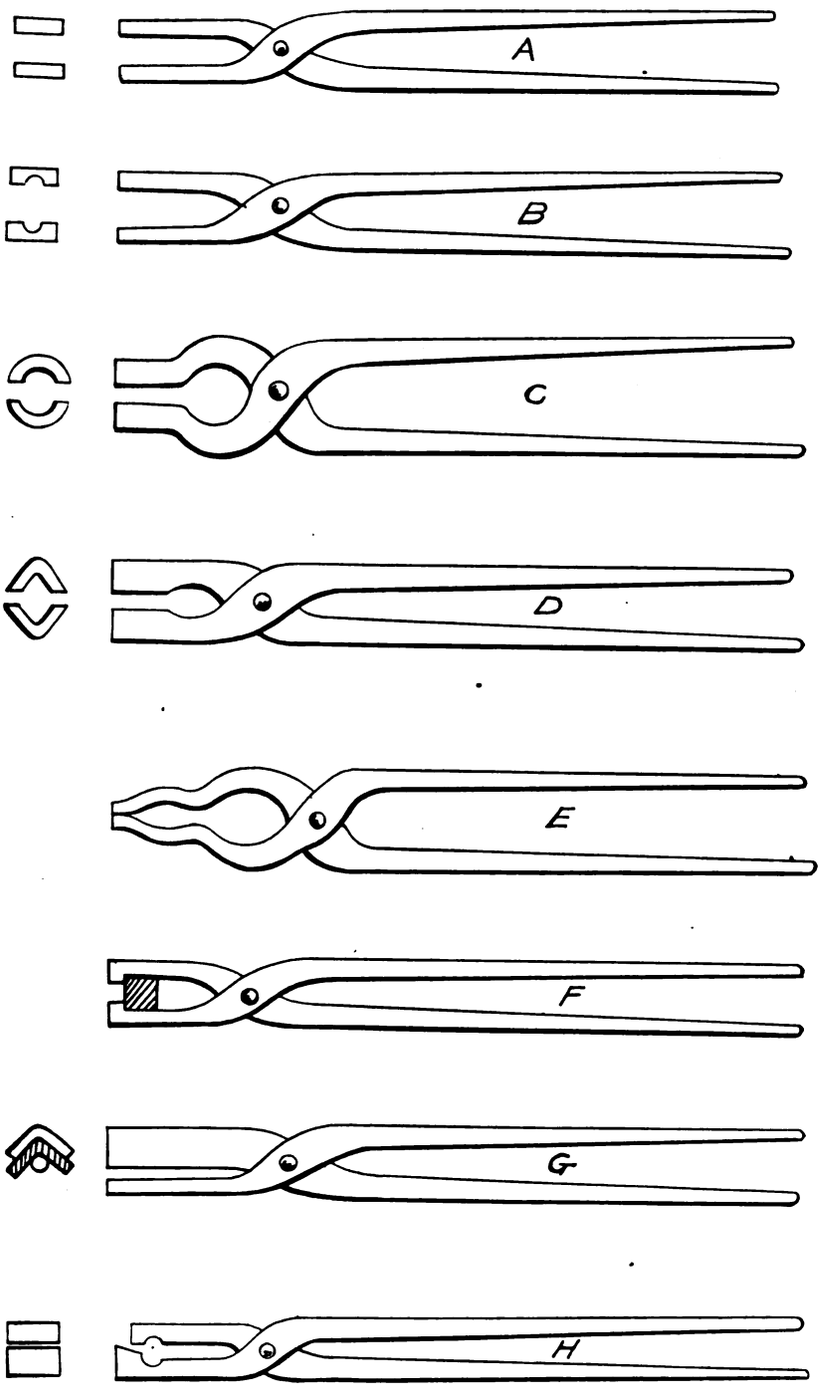
The above method is used when hardening in a gas furnace, but similar results can be obtained by hardening Novo steel in a well-burned-through hollow coal or charcoal fire built up with fire brick. The tools will come out smooth, and of a gray appearance, and you will obtain the same results as to cutting qualities.

How to Temper Cold Chisels.

C. F. BRAINERD.
Imperial Pneumatic Tool Company.

With hundreds of chisels to dress and temper and also making chisels that stand the hardest kind of tests with 1, 2, 3, 4, and 5-inch stroke air-hammers which cut four or five times across a plate ⅜-inch thick and take off a chip ¼ to ⅜ of an inch in thickness and three feet long, I feel qualified to give instructions in the working and tempering of the various kinds and grades of tool steel. We work steel here that contains from 5 to 150 points carbon. There are also four different kinds of special high speed steel amongst the different shop tools. I have to make all kinds and shapes of lathe, turret lathe, and shaper tools, temper all sorts and shapes of milling cutters, taps, dies, reamers, drills, etc. So for the benefit of the craft and my brother smiths in general I will give a general outline of the way I make an A No. 1 cold chisel.

Having selected the piece you want for a chisel—it may be ⅜ or ½ or ¾-inch or larger, octagon or round,—heat at least two inches of the end to a bright cherry red and draw with good heavy



THE PROPER TONGS FOR THE WORK AT HAND IS HALF THE BATTLE

blows over the larger part of the horn of the anvil and pound it equally on each side. Do not pound it after the red leaves the steel. Reheat slowly with very little blast, turn your chisel over often and heat evenly until a dark red or until all black spots disappear. Then finish up your chisel to the required shape and size. As it may take three or four heats to do this, always straighten up the edges the first thing after you take it out of the fire. Then pack down on each side equally, and never touch the edge of the chisel after you pack down the flat sides. If the edge is too crooked to suit you, file or grind it straight, and never pound the steel after it gets black. In forging your chisel, do not cut into the steel with the edge of your hammer or sledge, for it will cause strains that will make what are called water or fire cracks, which in reality are no less than forging strains made with the hammer. So remember to always strike flat. Trim off the end ¼ or ⅜ of an inch to take away any rough or ragged ends, so as to leave a clean edge.

Having followed the instructions carefully, you will have a chisel with no cracks and the least possible num-

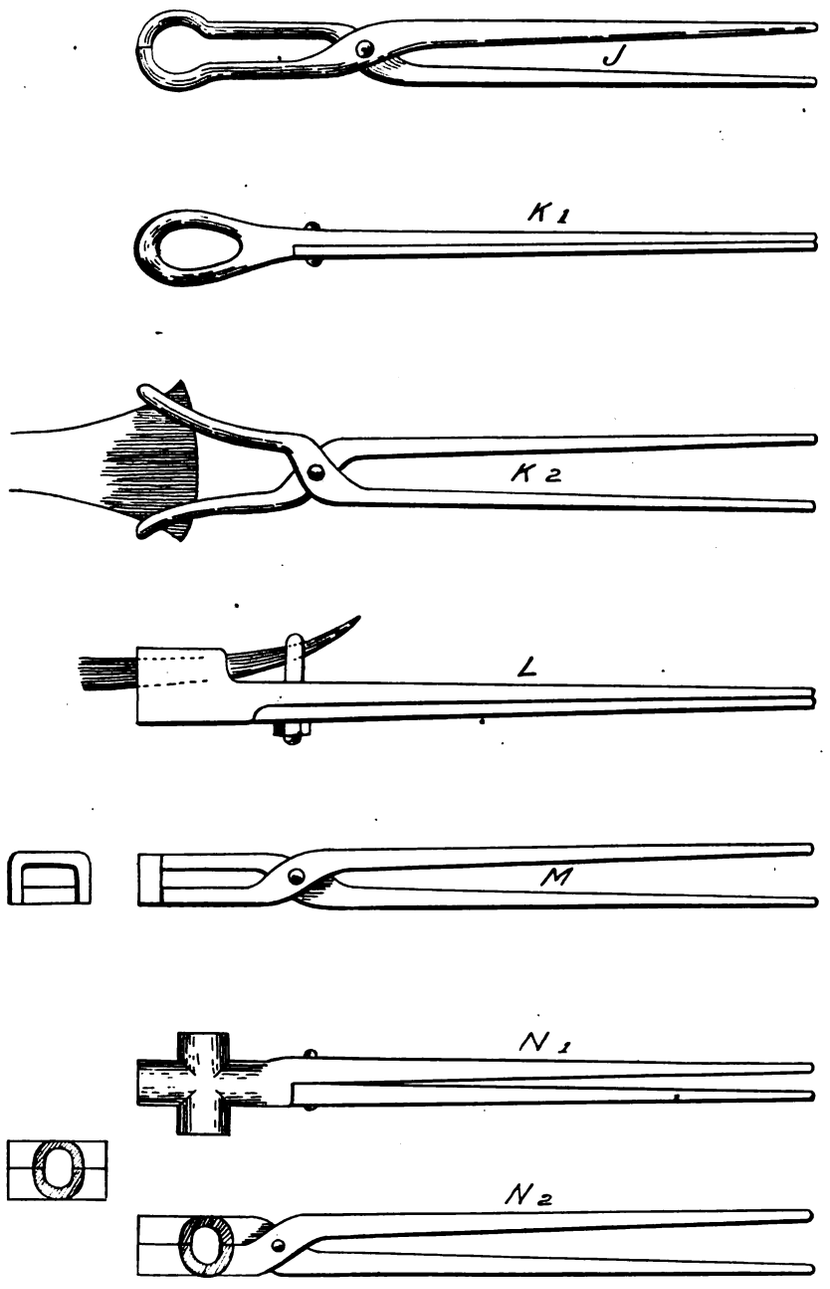
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ber of strains in it. When you heat to temper, pass the thin cutting edge through the fire past the hottest part and heat the tool up in the heavy part and let the heat run toward the cutting edge. Heat slowly and evenly at least three inches of the end to a dark red, or the lowest heat that the steel will harden at, which can be determined by a fine file. Then dip straight down in water, or salt water, or any good tempering solution, at least 1¾ inches, and move about or up and down until that much of the end is cold. Then take out and wipe the water off, and polish the surface with a stick 16 or 18 inches long about 1 by 2 inches, and a sheet of emery cloth or sand paper wound around one end and tacked on. Then watch the color run down slowly until the blue reaches the point, then cool off and you have a chisel that will cut most anything except very hard castings. For hard castings, let the color run to a very dark brown or light purple. A trial or two, a little common sense, and some good judgment will make a good chisel.

Handling Work with the Proper Tongs.

A. D. GILBERT.

Proper tongs are half the battle. It is almost impossible to do work properly when attempting to hold it with tongs that allow it to wobble. To tell how to make the tongs illustrated is not my desire. I simply wish to show and explain a few designs that I have come across. Some of these will, no doubt, be old to some readers, but I think that a few at least will appear new.



A SMITH'S ABILITY CAN USUALLY BE MEASURED BY THE CONDITION OF HIS TONGS

The pair shown at A are simply plain regular tongs. Those at B are grooved down the center of each jaw. They are very good for handling round, square, and octagonal stock. The tongs shown at C are for handling large rounds, bolts, etc. At D is shown a pair of tongs for handling large squares. They are made so as to be serviceable for the handling of flat stock also. The tongs generally known as "pick-up" tongs are shown at E. These are so well known in smithing circles as to need little introduction to readers. The tongs shown at F are for handling square stock when the stock is too long to grab the end. The hooks at the end of each jaw prevent the stock from slipping. For the handling of angles, tongs as shown at G are made. The upper jaw, as shown, is made to conform to the angle, while the lower jaw is round to fit the inside of the angle. At H is shown a very handy tongs for holding chain links, clevises, and such like. The bow tongs at J are for holding nuts, collars, and such things of various sizes. The jaws are made long so as to accommodate a variety of sized stock, although the longer the jaws the lesser the strength of grip. The tongs shown at K were made principally for holding the picks used by pavement cutters. These picks are pointed at one end as the regular dirt pick, but the other end had a wide chisel edge in line with the handle. This end is used for cutting asphalt pavement. To hold the pick solidly while working the pointed end of the tongs shown at K were used. The tongs shown at L are for holding the pointed end of picks. The rivet is a threaded eye bolt with a nut to hold it. The pick is steadied by the eye, while the tongs jaws hold it for turning. At M is shown a pair of special tongs for holding flat Ts. The tongs at N are for holding rounds, and are especially handy for holding round Ts.

It is taken for granted that readers are sufficiently acquainted with the making of tongs as to make the forging of any special design very easy.

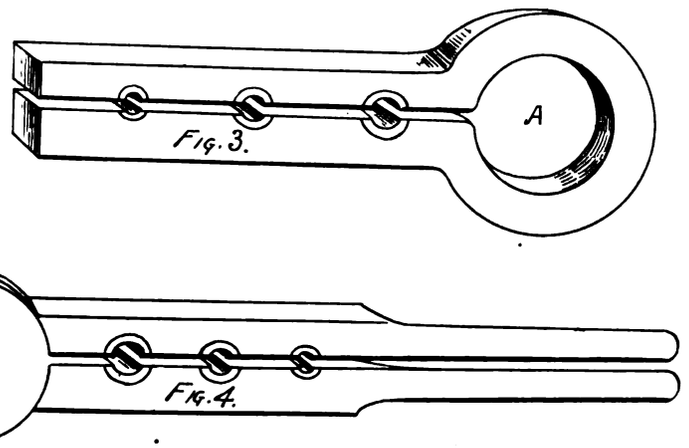
Quick Methods for Making Bolt-Heads.

W. HUDSPETH.
Australia.

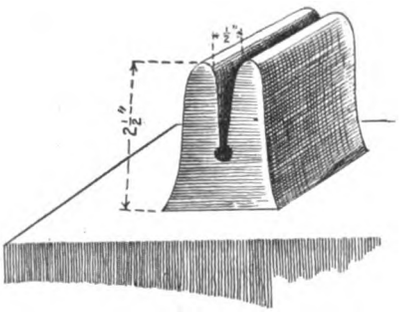
A vast amount of time and energy is wasted in some smith shops in making bolts. Certainly they can be bought cheap, but cheapness is not the only detail we have to consider. Very often bolts are wanted which are not the

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standard size, such as countersunk bolts with extra large or small heads, whichever the case may be, and very often it is impossible to purchase the exact length bolt necessary, and when a few hundred are wanted, it means a lot of work and very often a waste of valuable time. The tools shown in the accompanying illustration are very useful and economical in making bolt heads and when a large number are wanted, they save a vast amount of time which otherwise would be necessarily wasted.



BOLT-HEADING TOOLS OF SIMPLER DESIGN FOR OCCASIONAL BOLT WORK



A VERY SIMPLY-MADE HELP FOR THE PLOW SMITH

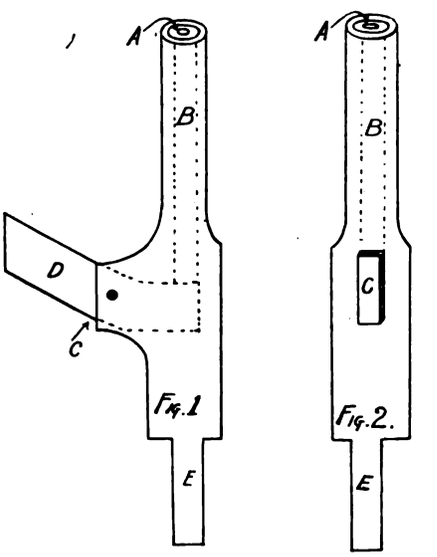
Figs. 1 and 2 show two views of a handy labor and time saving bolt tool. At A in Figs. 1 and 2 is shown the face of the tool. The channel or hole into which the iron which is going to be the bolt is dropped, is marked B. The slot at C is where the kicker D fits. The stem E fits into the hole in the anvil when the tool is in use. To operate this tool, the irons which are to be bolts are cut off slightly longer than the finished length of the bolts. The extra length is for the bolt-head. The smith heats these irons one at a time on the point and drops them into the channel B. The striker hits them down with a couple of heavy blows with the sledge hammer, which, if a counter-sunk bolt, finishes it. If a cuphead, the smith places a cup tool on the top before the blows are given. The smith then taps the kicker D with the hand hammer, and the bolt jumps out with the head forged the exact shape and size needed. It will be noticed that the head has only taken two or perhaps only one blow with the sledge to forge it, therefore it may be easily seen what a very useful tool it is, and the readers can easily imagine the number of bolts it will turn out in a very few hours. If the bolts are to be of different lengths, a number pieces of iron of different lengths, and the same diameter as the bolts, are kept handy. These are dropped into the channel to make up the length of the bolt if it is to be short. It will now be seen that the tool will make any length bolt which may be required, consequently adding greatly to its value.

To make the tool, take two pieces of flat iron, the dimensions of which depend, of course, on the size of the bolt it has to make, and forge out roughly to the shape of Fig. 1, and sandwich pieces of iron above and below where the slot hole is to be. Care must be taken to leave the slot hole longer than the width of the kicker so as to give it plenty of room to be operated when jumping the bolts out. When all is welded securely, the part below the slot hole is shaped and fitted into the anvil hole, whilst the top half or barrel is rounded down to the required dimensions to suit the size of the bolt. A piece of blister steel is then welded on to the top to form the face and the channel hole B is drilled the size to take the stem of the bolt. The face A is then counter-sunk or left flat to suit the style of head and the channel hole is squared on top if the neck if the bolt is to be square. The kicker D is made to fit loosely into the slot hole and works on a rivet as shown in the engraving.

The reader can readily see the rapidity with which this tool will turn out bolts; and whether they are to be made in large numbers or only in small lots, this tool will be found of considerable worth, both as a time and as a labor saver.

A very handy tool for roughly making $\frac{1}{4}$, $\frac{5}{16}$ and $\frac{3}{8}$-inch boltheads is shown at Fig. 3. It is forged from a piece of $\frac{7}{8}$-inch square steel and shaped as shown in the sketch with a bow bent as at A. The inside edges of the tool fit neatly, and the three different sized holes are drilled rather small and afterward filed eliptical shape so as to grip the neck of the bolt firmly. To operate this tool, it is placed in the vise with the two faces of the same a little apart which are kept so by the spring in the bow at A. The irons are heated at the point as in the previous case and placed one at a time in the holes with the hot point projecting and then smartly hit down to the shape required with the hand hammer and the cup tool, if necessary. The vise is then opened and the bolt lifts out with ease. It may be mentioned here that the vise which holds this tool must be fairly powerful or, failing that, a flange may be forged on the outside edges of the tool which will keep it from slipping out of the vise whilst the head is being formed.

Another tool at Fig. 4 works on the same principal, except that a hinge takes the place of the bow and on the opposite end a couple of handles are forged.



A PRACTICAL BOLT-HEADING TOOL FOR THE PRACTICAL SMITH

To operate this tool the bolt, or that which is to be the bolt, is placed in the open jaws. The tool is then closed and a link slipped over the handles which

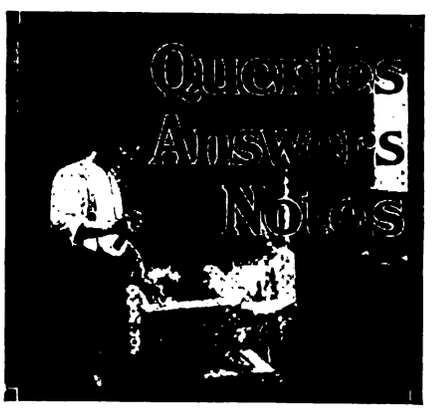
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holds the bolt firmly whilst being knocked down over the hole in the anvil. When the head is shaped, the handles are pulled apart and the finished bolt drops out.

A Simple Plow Help.

HARRY R. DONALDSON.

I see a good many new kinks in the journal every month, and want to give my mite toward helping the craft. The accompanying illustration shows a little anvil help that is very handy when pointing shares. To make it, take a piece of an old axle and draw it down wedged shaped for about three inches. Now split it for about 2½ inches from the pointed end. Now fit the other end with a shoulder and forge square to go into the hardy hole of the anvil. The wedge end is now heated to a red, the piece placed in the hardy hole and the split end opened to one-half-inch wide.



The following columns are intended for the convenience of all readers for discussions upon blacksmithing, horseshoeing, carriage building and allied topics. Questions, answers and comments are solicited and are always acceptable. Names omitted and addresses supplied upon request.

Who Recuts Old Rasps?—Where can I send old rasps to have them recut? Will some brother kindly tell me. C. G. W.

Which is Best?—I would inquire of Brother Ussery, who says he has used five different kinds of cold-tire setters, which does he consider the best to buy, or what kind did he buy? A. MOORE.

Wants a Polishing Wheel.—Can some member of the craft tell us how to make a polishing wheel to put on the emery grinder for polishing cultivator shovels and plow points? J. R. H. & SON.

Wants Information on Track-Making.—Can the readers of THE AMERICAN BLACKSMITH tell me anything about making track work for a coal mine? I have a job of this kind on hand, and should like all the information I can possibly get. B. R. PACE.

Wants to Temper Small Springs.—If any brother would please tell me how to temper all kinds of small springs, such as gun springs, etc., and explain what process to use I would thank him very much for his favor. P. LARSON.

A Sinking Tire-Platform.—Will some brother blacksmith kindly supply us with a plan for a sinking, tiring-platform? We would prefer, of course, as simple construction as possible consistent with stability. NEW ZEALAND SUBSCRIBER.

Wants to Shoe a Foundered Horse.—Will some horseshoer tell me through the columns of THE AMERICAN BLACKSMITH how to shoe a foundered horse so he can walk? He is very lame. The horse is a very handsome animal and weighs about 1,400 pounds. H. S.

Do you Shoe Saddle-Horses?—I would like to have the advice of some brother on shoeing saddle-horses. I haven't noticed anything on the subject in the columns of THE AMERICAN BLACKSMITH, and hope several brothers will give some of their experience. AN ILLINOIS HORSESHOER.

Handling Dead-Beats.—In the April number Brother A. N. Atkins wants a few pointers on how to handle dead-beats. A man once asked advice on how to get married and received the answer "Don't." My advice on how to handle dead-beats is just the same—Don't. D. F. HALL.

Coal, Brazing and Tempering.—I want to ask several questions through the columns of "Our Journal." First: What is the best smithing coal and where can we get the very best? Second: How is copper wire brazed? Third: How are cold cutters tempered for cutting railroad rails? Fourth: How can I braze cast iron and what are the proper ingredients to use to make a good job? J. H. S.

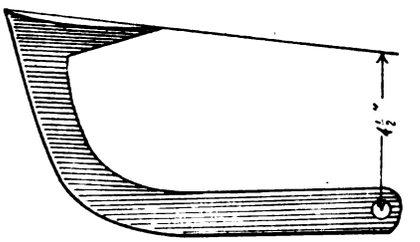
Heating Wide Tires.—Replying to Thos. H. Long, relative to welding tire so the bottom lap will not burn before the top lap gets hot, if Brother Long will put his tire in the fire, turn on the blower until the bottom gets hot, then shut off the blast until the top lap gets the same heat as bottom, and then turn on blast and let it come to a welding heat, he will have no trouble. A. MOORE.

Our Journal in New Zealand.—I received my first copy of THE AMERICAN BLACKSMITH a few days ago, and I find many useful points in the paper which will no doubt enable me to solve the difficult problems, which I find in my everyday work. I am anxious to get next month's copy, which will, no doubt, be no less interesting than the first. GEORGE SALTER.

A Letter from Kentucky.—I have taken your paper one year and like it very much. It is a paper which should have been in circulation years ago. I have been working at the trade for 30 years, although I have been working at a disadvantage most of the time on account of botch shops. I think that the smiths should have some protection one way or another. When I can find time, I am going to visit the smiths of my neighborhood and endeavor to get them to rearrange some of their prices. Different states have different kinds of work and different prices, but every craftsman should help his neighbor and talk to him and tell him they can get better wages. It is certainly hard labor and they earn all they can get. E. T. ROBINSON.

Several Questions from Australia.—Why is it that in putting rims on wheels, either of hickory or other wood the rims split at the holes? Is there to be had in America a machine with drop hammer die, pressure die or anvil block for making vehicle spring scrolls? I make these by the hundred and can get nothing in the Colonies to make them on. By inquiry am told there is nothing to be had for the construction of them. PERCIVAL WHITE.

How to make a Cant Hook.—Have been watching for answers to the question on how to make cant hooks. I work in a



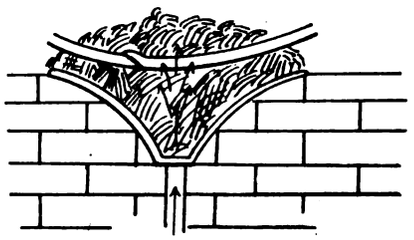
HOW TO MAKE A SERVICEABLE CANT HOOK

lumber business where we handle all logs from pine up to 30 inches, so will give my experience in making hooks to give good satisfaction. I have followed this kind of blacksmithing for fifteen years. In the first place, make a heading tool out of stock 4 by ⅝ of an inch and 1 foot long. Punch a hole 1 by ½ inch in center of the piece and cut out the end you are to have your bill on, say about ⅜ of an inch deep at the hole running out to nothing at a distance of 3½ or four inches from hole. Cut it out rounding if you wish a duck-bill, and right down to a point if a diamond bill. Now your tool is ready for use. Cut your steel for a good, heavy head 20 inches long from 1 by ½-inch stock and upset one end until your piece measures 15 inches, keeping it straight on the back and doing all your upsetting towards the bill. Then heat and drive down with sledge into your tool, being careful to draw your steel towards the heavy side so as to form the bill. In drawing down your steel will get wider and when you have it down 1¼ inches from the face of your tool to top of bill, corner it up on the horn of the anvil, always drawing towards the point which is drawn out in this way and diamond shaped to a point. Leave the back of the bill hollow in center when you put straight edge on, so it will come out of the timber easily. Now that the bill is made, dress and even up all around and punch hole for $\frac{7}{16}$-inch bolt in other end. Then bend the back of the hook round, leaving it a little straight at the end in which you punched the hole. Now take your square and place your hook in the corner and bend back so it will measure 4½ inches from the center of the bolt hole to the line of the head. Your hook will handle logs up to 30 inches. If your timber is larger than this use more stock and upset same amount for head according to size of logs. I hope this may help our brother in the mountains to make hooks. I well remember the time I used to sweat over them, and would have been pleased to have the paper come to my rescue in many other jobs as well as hooks. I am greatly pleased with our paper and derive much benefit from it. A. WOOD.

Wants Tempering Information.—I should like to ask through the columns of your valuable paper what is the best way to temper rock drills. I have had considerable trouble with cracks in tempering, and I

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should like to know if all blacksmiths have the same trouble. In shaping a bit on a new bar of steel, cracks will hardly ever develop in the first tempering, but by the time the drill is sharpened the second or third time, cracks are sure to show up, and I should like to know if the fault is mine. My method is to heat the bit a dull cherry red and drop in slack tub. A. K.



LET THE BLAST STRIKE THE TIRE AT ONE SIDE OF THE SCARF

A Boiler Tube Kink.—I will give you a kink that will be worth millions to readers who put boiler tubes in traction engines. In the roller expanders, tell them to put in new rollers and to make these rollers taper so they will be largest on the end that goes into the tube. Then the expander will set the tube out just as much on the inside of the head as it does on the outside. The expander mandrill being tapered, it sets the tube out most on the outside, but if you make the rollers taper as much to the inch as the mandrill does, there is an even pressure over the whole thickness of the boiler head. If this description is not understood, I will send a sketch. A. L. ERICSON.

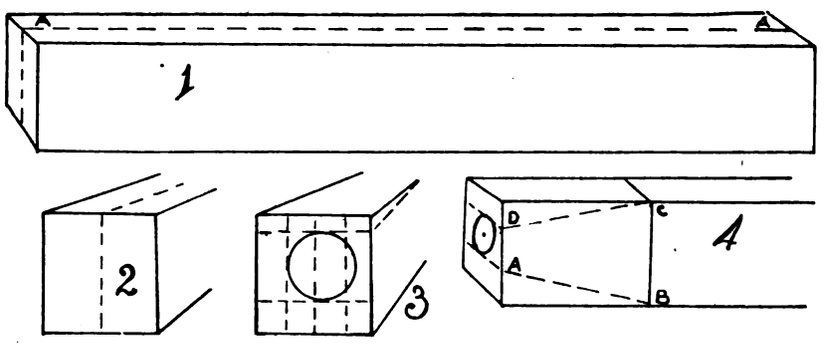
A Pointer on Making Harrows.—I see by this number a letter from a brother asking about harrows. I will tell him something which will be a great help to him, for it saved me many a dollar. I was working for a man in southern California who made a good many harrows out of wood. He used good, red fir, and finished them up fine. But when he drove a wire nail each side of the hole answering the same as bolts, he would hold his harrow tooth and drive half-way through, and the wood split all out the underside and made the job look cheap. He did not know what to do until a rancher came with a couple of common old two by four scantiling and wanted harrows made from them. The boss says: "How do you expect me to do anything with those? They will split all to pieces." "No they won't," says the rancher. "I'll show you how. You take and bore your hole the size you want. Then heat your tooth and burn a little from each side." We tried it and, do you know, we never even put in a nail, and never split a one after that. There was no further trouble when making harrows. CHARLES LAKE.

Welding a Heavy Tire.—In answer to Mr. Thos. H. Long's question on tire welding would say that this is a very simple question to answer. Most anyone ought to be able to solve this problem in a short time. The main thing is to get your tire scarfed, lap it together, and then place it in the fire as shown in the illustration, so that you will heat at one side of the weld. Don't heat too fast, push the lap to the center of the fire with plenty of good coke on top of the tire. Don't try to get a welding heat with an open fire. If you will follow this rule, you will have no trouble in welding your tires at all. Also bear in mind that the under lap should be left just a trifle heavier at the point. The main thing is a large and clean fire, and then care must be taken to not use too much air at the start. Use plenty of good welding sand. This should be clean, free from all dirt or anything which will form slag. The sand if clean and sharp, acts as a flux the same as borax. It melts and runs over the metal and prevents oxide from forming on the iron, and thereby you will obtain good results if this rule is closely followed. You will find that if you have a deep fire and plenty of coal over your work, that the tire will heat nearly as fast on top as it does on the bottom. C. W. METCALF.

Cold Tire Setting and Wooden Axles.—I have just received my paper and in looking over it, I notice the following language from Mr. B. E. Robinson: "Say, Mr. Cold-Tire Setter, why is it if your machine is so much better than the old way that the manufacturers won't put them out on trial?" I do not make or sell cold tire setters, but I use one, and in reply to above statement will say that Mr. Robinson has been misinformed in regard to the makers of cold tire machines, putting them out on trial. They do put them out on 30-days' trial, and if Mr. Robinson will write to the firms advertising their cold tire setters in THE AMERICAN BLACKSMITH, he will receive an offer of one on trial. He asks why do we find them setting idle from year to year, while the smiths set them the old way? We don't do that out here in Texas. We use them to good advantage. I have set 50 tires in a day on one machine, and done it as well as could be done hot. I am not condemning the hot setter. It's a good old slow way, when well executed. But there are so many people that can't set them hot and set them right. Give me the cold setter every time, even if the spokes are all loose and have to be wedged up. I always see to it that the spokes are not loose enough to rattle before I put the wheel in the machine. If all the spokes need wedging, take the tire off and wedge up. Then put on the tire, put in the bolts (new ones) and then set it cold. If only part of the spokes are loose, take out only as many bolts as are necessary to slip the tire to one side until the spokes are wedged. Then put bolts in and set cold. I generally set the tire in two or more places and each time on opposite sides of the wheel. This pulls the tire evenly all around, and it won't over-dish your wheel. If Mr. Robinson has a good run of tire setting, it will be money earned for him to buy a cold setter. I have been using them for four years and have used different makes. There are good and better makes, and if Mr. Robinson desires any further information and will write me, I will give all the information that I can. I am not after a controversy, but only desire to give this as information to Mr. Robinson.

Mr. W. J. Jones wants to know how to lay out a wooden axle. Draw a line from end to end on bottom of axle exactly in the center (see Fig. 1). Then with square make a perpendicular line on each end in center of axle as at Fig. 2. Now set your divider one-half the size of the small end of skein (inside measure). Make a center dot $\frac{3}{16}$ of an inch toward the front of the center line, and $\frac{3}{4}$ of an inch in further from the bottom of the axle than one-half the diameter of the small end of the skein or the distance of the dividers from the bottom plus $\frac{3}{4}$ of an inch. (See Fig. 3.) Now describe a circle. This serves as a guide in trimming down the axle. Now measure the length of the skein from the end of the axle and make a line around the axle. Then draw lines AB and CD and trim to these lines. Do the same to all sides and fit your skein by trimming to circle on end of axle, leave your circle as a guide to end of axle. Trim the other end the same. This will serve as a general rule for most wheels. If the wheels are over dished, cut less on bottom of axle according to dish. In brief, cut $\frac{3}{4}$ off of bottom of axle and set $\frac{3}{16}$ to front of center line. W. A. SHORT.

An Interesting Letter from Kentucky.—I am a young smith, but have worked at the trade since I was fifteen yeas old and I am now 32. I have been in this place for four years and am doing a good business and have a good shop with lots of tools. My shop is 20 feet wide, two stories high with an eighteen-foot shed one story high, full length, which I use for the iron or blacksmith shop. The other ground room is my wood room, and the upstairs for stock and for painting buggies. I do repair work and also make new buggies. In the back end of the blacksmith shop I have an engine room built with double walls and filled in with sawdust to make the room warm in winter, so my engine tank will not freeze and give me trouble. I see quite a number of the brothers give a list of tools and machines, so I will tell you about mine and how I got some of them.



HOW TO PLAN AND CUT TIMBER FOR A WOODEN AXLE

First and best of all, I have a six-horse I. H. C. gasoline engine of which I cannot speak too highly. I also have a 11-inch swing screw cutting lathe and a planer and sizer with mandrill that will carry a 36-inch saw. The following machines I made myself: One 28-inch band saw on which I used old bicycle wheels for the saw wheels,

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one emery stand and one jointer, all with home-made counter shafts. I also have one emery stand which I bought. I am now fixing me a circular saw table with a track for sawing heavy lumber and small timbers. I do all kinds of work, making a speciality of horseshoeing. I have found some quite valuable items on interfering, which I have used very successfully. I would like to see some items on the screw cutting lathe and on making tools for them and the best kind of steel to use. I will give you some of the prices I secure here:

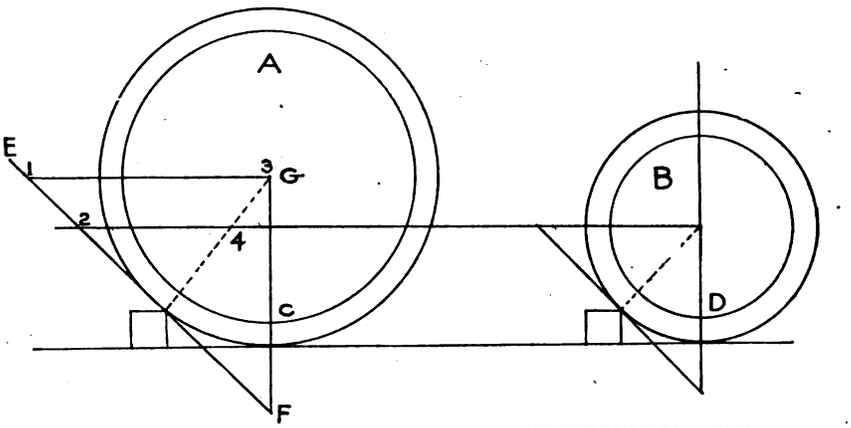
Horseshoeing, plain, new	$1.20
Horseshoeing, toed, new	1.40
Shoeing stallions, new and old	4.00
Resetting old shoes	.60
Tire Setting, each	$.50 to .65
Wagon tongue	2.00
Wagon Hounds, front	2.50
Wagon Hounds, hind	2.00
Filling Wheels, old hubs, front wheels	3.50
Filling Wheels, old wheels, hind wheels	3.50
New box bed with side boards	16.00
Painting wagon gear	4.00
New buggy tire ⅞, $5.00, 1 inch, per set	5.00
New buggy shafts, each	1.00
Welding shaft irons	.25
Grinding chilled plow points, each	.10

Our other prices are about in the same proportion. CHAS. DOLPH.

Several Pointers from West Virginia.—Some one says that to build a good blacksmith fire you should place a three or four-inch pipe over the tuyere, then pack coal around it with the sledge, and it will furnish all the coke that is needed by removing pipe and building fire in the hole. This would make a good fire, but the constant changing of work would soon change the condition of the fire. Here the work is changing constantly.

Now the way we do it is as follows: When going into the shop in the morning we place upon the fire green coal to the amount we think we will use for the day, being sure that we have plenty. We burn this until it becomes well coaked and all the oil burned out of it, then we roll it back on forge and water it. While we clean up around the anvil and pick out stock, the forge cools down and we are ready for work. This fire is good for either iron or steel at a moment's notice. If it gets dusty, let it out below or throw it out above. We use Buffalo blowers and the H. H. tuyere irons, and I have found nothing better.

Now, just a few remarks on horseshoeing. I never served as an apprentice, nor was I ever bossed by any man. I started this way: I bought a shop and the next day I had a good old smith working for me, and the shop running its full capacity. This smith was, however, in the habit of heating the shoe and holding it on the foot to see whether it would fit and to help level it to the foot. I watched him burn the horse's feet just about off, until one day he spoke about the shoes he was wearing. He said that they hurt his feet, and that during the day I should get him a pair. I bought the shoes, brought them into the shop and placed one of them on the fire. He noticed me and says, 'In the name of goodness, man, don't burn my shoes up.'' I told him that I was just heating it to fit it to his foot, that it would close up the pores and make his foot soft, so it would be easy fitting. This was a number of years ago and I have never since allowed any man to fit a shoe on a horse until it had been cooled in water. I have shod some horses continually from the first shoes of colthood to the last in old age, and I have had no trouble. If a horse interferes without shoes, it will be hard to stop him, but if he interferes only when the shoe is on, it is the fault of the shoe. I have yet to find a horse that will cut his legs without shoes. J. D. SKIDMORE.



WHICH IS EASIER TO HANDLE, A HIGH OR LOW WHEELED WAGON?

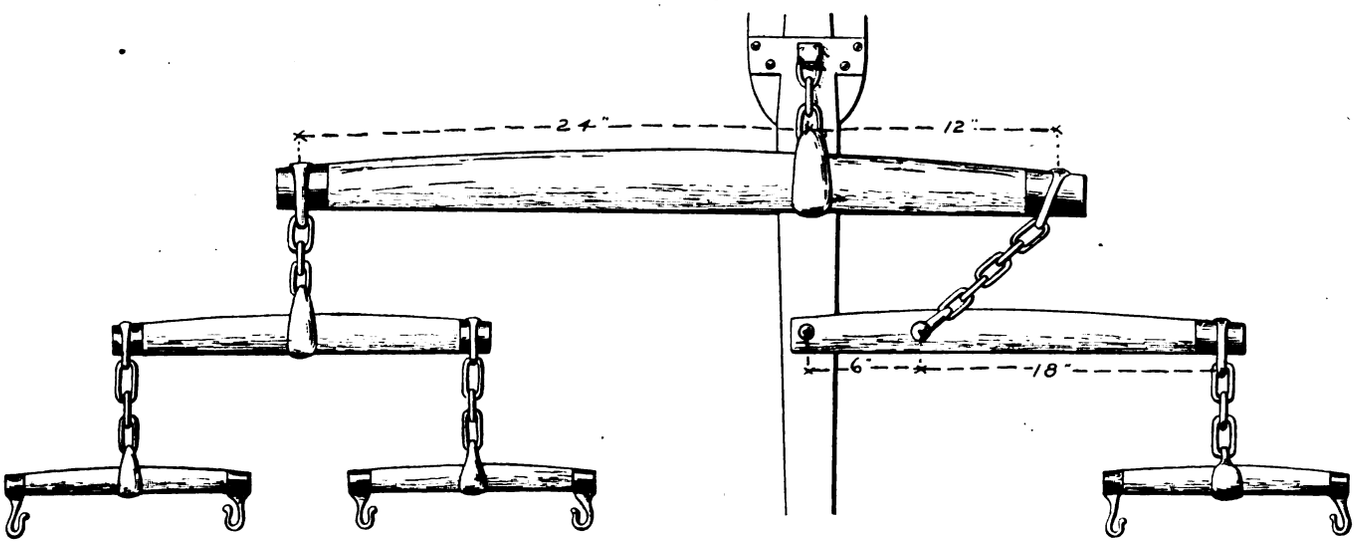
Which is Easier to Handle?—In the April issue, our friend, P. M. Wade, explains the reason why a load on a high-wheel is moved over an obstacle easier than on a low wheel in a way that does not satisfy me. And I offer that the inner portion of the load that has passed over the obstacle in any material degree helps to pull the wheel over the block. Indeed this appears to me to be a question of whether a weight can be moved or lifted as easy with a short level as with a long one, the space being the same between the fulcrum and the weight. The wheel or pulley is a system or combination of levers. It is said to have been in the principles of its application first announced by Archimedes in the second century B. C. And I would suggest that it is in the greater purchase of the combined leverage that permits of an easier movement of the higher wheel over an obstacle than of the lower. To illustrate this, we will take the two wheels used by Mr. Wade; the one 50 inches and the other 40 inches diameter. Now draw a horizontal line from the center of each wheel until the lines intersect a line EF tangent to the large wheel—this tangent being 45 degrees from these horizontal lines, and the same from the perpendicular radius GF of the larger wheel.

It will be noted that there are two lever principles applied here and actuated at the draught points 1, 2, and 3, 4—in the one the fulcrum is between the weight and the power and in the other the weight or lever is between the power and the fulcrum. The lever EF playing upon the fulcrum O, has a tendency to lift the wheel and lever in the direction of the radius EF, when the power is applied at 1 and 2. At the same instant, the same power acts on the lever GF, which has its fulcrum at F or the surface of earth. Now it is manifest that this power applied at 1 and 3 of the respective levers accomplished a lifting and a propelling movement greater than if applied at 2 and 4. And as the radius of one wheel is 25 inches and of the other 20 inches, it is apparent that the protracted sides of the right angle triangles give hypothenuse of vastly different leverage power, in fact difference of about 35%. This, however, is largely lost in the horizontal draught against the obstacle to be overcome. The difference of the leverage or purchase power of the radius is 20% in favor of the higher wheel and this is wherein the chief advantage lies. The points C and D in the two wheels mark the distance from the resistance to the place of the application of power on the respective radii. P. I. MOULE.

A One-Man Shop of Illinois.—My shop is 20 by 40, with an addition of 10 by 24 on the back end. This I use for a grinding room. I have a good engine room in one corner of my shop. My tools and machinery, as you will notice, were about all suggested and advertised in THE AMERICAN BLACKSMITH. As far as I have been able to observe, they are the highest grade that money will buy at the present time. At the head of the list is my gas engine. It's a Lennox, six horse and a very fine machine—weight 2250. Some difference between that and a 1200 or 1400-pound engine. My trip-hammer is a Hawkeye, and I consider it the best for heavy forging. I have a large emery floor-stand for plough work, and a six-hundred-pound grindstone, which I use for grinding the rough rust off ploughs and discs before polishing. I have two corundum wheels and the two emery wheels and twelve muslin and canvas buffs. The buffs are 2½ and 3 by 12 inches. This is a fair supply when you are busy and have to do a lot of polishing. I have a good blower with a brick forge—bricks laid in cement and plastered on outside with cement. There is also a Hay-Budden anvil, a Western Chief drill and a set of drills running in sixteenths from one-sixteenth up to an inch. There are twelve hammers running in weight from light riveting up to a three and a half-pound hand hammer, one pair of Edwards shears, Little Giant screw plate, full mounted, cutting from quarter inch to seven-eighths, a full set of heading tools up to one inch, one solid box vice, and a large supply of tongs. I carry a large supply of rivets, nuts, washers, bolts, and small tools of almost every description. I don't do wood work, but have a good supply of planes, saws and drawing knives. I have also two large tool cases with about 50 compartments for small tools, bolts, etc., a pair of Barcus Stocks, one Monarch disc sharpener, and a first class set of shoeing tools. I carry a good supply of factory shoes, also keep a supply of hand-made shoes. Also have a good case of hand-made

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shoes, nickel-plated. I have a large supply of hand-made S wrenches from very small to very large, four monkey wrenches from six-inch up to twenty-one, and pipe cutting tools and pipe wrenches. My shafting, pulleys, hangers, and belts were all bought of W. D. Allen & Co., of Chicago, Ill. The hangers are universal ring oiling, and require oiling about once in six or eight months. This, I believe, will give the readers of THE AMERICAN BLACKSMITH a fair idea of how a one-man shop in western Illinois is equipped. I started learning the trade twenty-five years ago, and I am still learning. T. C. LESSIG.



BROTHER E. A. WRIGHT'S PLAN FOR A THREE-HORSE EVENER. HE SAYS IT WORKS VERY WELL ON A WAGON OR DISK HARROW

A Successful York State Shop.—Can you give me the address of a firm that makes an oil tire-heater. We must buy something of this sort for two reasons: First, we want something that is always ready without stopping to chop wood. We don't have time for such exercise, since the people found out we had power in the shop. The other reason is the yard we had for such purposes now contains an addition of 22 by 50 feet to our present shop. It has two stories and now gives us a total floor space of 7,000 square feet. I would advise any blacksmiths intending to put power in their shops to put in from five to 10 H. P. more than their present wants. We kept adding one machine at a time to care for our increasing trade until we overloaded our power. Then another problem confronted us. I will state our experience in that line.

Four years ago I moved from a small shop 20 by 30 feet and one story high, where I had worked 13 years doing all the work by hand, into our present quarters, a two-story brick building 30 by 80 feet. Here I put in a half-H. P. electric motor; power enough to run our drill, emery wheel and grindstone. Then when I saw how easy I was doing my work I bought a Wiley and Russell bolt cutter or threading lathe. My motor not being strong enough, I sold it and bought a 3-H. P. motor, thinking I now had plenty of reserve power. Business increased and having a good, sober and industrious young man of 21, who had worked three years, I sold him a half interest in the business and bought more machines and also stock. We then decided to put in a band saw, and two months later we bought a jointer. Then having over-loaded our motor, we put in a separate main line shaft to run our wood-working machinery. Our business was increasing all the time. We decided this winter to add more machines and had our painter move out from the second story, and we put in a 15-H. P. electric motor upstairs. Here we put our band saw, jointer and circular and cross-cut saws, intending to add more machines below as the business will require. At the present day we own the largest shop in this city, and from a one-man shop we have grown to working two blacksmiths and three wood-workers all the year round, and from one to three helpers according to the seasons.

I consider this success due to two reasons: One is that we do all the jobs that come our way, from repairing a baby carriage to an automobile with a good side-line of cabinet making. The other reason and by far the more important is that I am a constant reader of THE AMERICAN BLACKSMITH since the first issue, and do not think I could do without it. I often set up after a hard day's work and read it from cover to cover, and find as much interest in reading the advertisements as the rest of "Our Journal." I say "Our Journal" because all blacksmiths should read it and because I consider our present success due to THE AMERICAN BLACKSMITH "Our Journal." E. A. BARNARD.

Wanted: Trip Hammer Information.—While in the first place, I wish to express my appreciation of your very excellent journal, it just occurs to me that this would be a good time to ask a question or two on a subject to which very little attention seems to be paid. That is the subject of trip hammers. I am deeply interested in the subject in the first place, because I have been operating tirp-hammers on agricultural blacksmithing principally and railroad work occasionally for nearly twenty years. The subject is of more than ordinary importance at the present time, when all manufacturing establishments are being taxed to their utmost to keep pace with the requirements of the market. Of course, it is of primary importance that the up-to-date smith should furnish his shop with the most efficient machinery which the market offers. I have visited scores of shops where some sort of excuse of a trip-hammer sat silent and dust covered in some out-of-the-way corner, and in reply to the question, "Is your hammer in working order?" the smith would say, "O, yes, the trip-hammer is in first class condition," and he would probably proceed forthwith to give a lecture on its many fine qualities, and all the while the poor old hammer sits there, a silent witness to its own uselessness or its owner's ignorance. Now it seems to me that of all the labor-saving devices which have been introduced to the smithing craft, this one should rank first. None, in my opinion are capable of so wide a range of service as the trip-hammer, and at the same time so easy to operate. Of course, it can never take the place of the steam hammer on certain lines of heavy work, and yet with a good trip-hammer properly adjusted, it is marvelous what can be done. On the machine I am operating at present I can do the lightest swaging and in a few minutes readjust the machine and weld the largest well drills with perfect ease and satisfaction. Now I come to my first question: Why doesn't somebody write who knows ten times as much as I do about trip-hammers and give us a lot of good pointers on the subject?

The second question I want to ask is: Which in your line of work and experience is the best trip-hammer, and what is your line of work? If you want to know which I think the best, I would say that, while I am not writing to boom any hammer, just give my vote in favor of the Bradley Cushioned Helve hammer. Now, brother smiths, come along. Let us hear what you think on the subject and what are your preferences and why, and what is your line of work and what you can do. I forge from four hundred and fifty to five hundred plow beams per day of 10 hours on my Bradley, or 250 coulters, or 2000 harrow teeth, the teeth tapered a length of six inches. This, I am aware is not extraordinary, but just a fair gait. I have heard of twice that amount of harrow teeth being drawn, but I fancy they were just pointed and not tapered back so far. I will be glad to give or receive suggestions in regard to the constructions of dies for forging work under the trip-hammer. JAMES O. CHURCH.

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These drills are made with ¼ in., ½ in. and ⅝ in. round shanks fitting all makes of Blacksmiths' drill presses. They are properly constructed of good tool steel and they will STAND SEVERE SERVICE

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Blacksmiths Recommend Our Rasps
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Prices Current — Blacksmith Supplies.

The following quotations are from dealers' stock, Buffalo, N. Y., June 1, 1907, and are subject to change. No changes have taken place since last month's quotations.

All prices, except on the bolts, are per hundred pounds. On bars and flats prices are in bundle lots.

Bars—Common Iron and Soft Steel.

¼ in..	round or square;	Iron,	$2.95	Steel,	$2.95
⅜ in.,	"	"	2.55	"	2.40
½ in.,	"	"	2.35	"	2.20

Flats—Bar and Band.

¼	x 1 in., Iron	$2.40	Steel		$2.40
¼	x 1½ in., "	2.30	"		2.30
3-16	x 1½ in., "	2.50	"		2.50

Norway and Swedish Iron.

¼ in., round or square	$4.90
⅜ in., " "	4.50
½ in., " "	4.30
¼ x 1 in	4.80
¼ x 1½ in	4.20

Horseshoe Iron.

For No. 1 shoe, ⅜ x ½ in	$2.50
For No. 2 shoe, ⅜ x ⅝ in	2.50
For No. 3 shoe, ⅜ x ¾ in	2.50
For No. 4 shoe, ⅜ x ⅞ in	2.50

Toe Calk Steel.

½ x ⅜ in. and larger ... $3.00

Carriage Bolts. (Net Price per Hundred).

¼ x 2 in	$0.54	⅝x2½ in	$0.82
¼ x 2½in	.58	⅝x3½ in	.96
¼ x in	.62	⅝x6 in	1.31
5-16x 2 in	.65	½x4 in	1.70
5-16x 3 in	.75	½x6 in	2.10

Spring Steel.

⅝ to 1¼ in. Rounds. Op. Hearth $3.00, Crucible $5.00
1¼ to 6 in. by No. 4 gauge to ½ in. Flats " 3.00, " 5.00

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FOR SALE—Best blacksmithing business in northwest Texas. **Lacewell & Smith, Claude, Texas.**

WANTED—Ambitious men to act as agents for our fine line of calipers, etc. Address **E. G. SMITH CO., Columbia, Pa.**

WANTED—Agents to handle a line of Taps and Trimmings and up to date specialties. **BUOB & SCHEU, Cincinnati, Ohio.**

FOR SALE—Blacksmith shop and tools. For further information write **CHAS. A. HAMMILL, Ree Heights, Hand Co., S. D.**

FOR SALE—Blacksmith shop. Write at once. Don't buy until you hear from me. **Box 132, Dardanelle, Ark.**

FOR SALE—Blacksmith shop with all modern equipment. Work for two men year around. **W. M. LARSON, Whiting, Iowa.**

FOR SALE OR RENT—Blacksmith and woodworking shop. Tools and stock. Good stand. **H. T. COVERT, R. F. D. 2, Ovid, N. Y.**

FOR SALE—Complete set 4 to 25 H. P. gas engine drawings, patterns and patents. Patterns in Providence, R. I. **Hadwen Swain Mfg. Co., San Francisco, Cal.**

WANTED—Salesmen for Extension Axle Nuts. Sure cure for wabbly buggy wheels. Exclusive territory. Big commission. Special introductory offer. **HARDWARE CO., Box Z 10, Pontiac, Mich.**

FOR SALE—Blacksmith shop and residence. First-class stand. Possession given at once. Beautiful location. For particulars address **C. E. McCRACKEN, Sussex Co., Layton, N. J.**

WANTED—Traveling men who visit the carriage, implement and livery trade make big commissions, selling our steel and rubber-tired wheels, as a side line. Why don't you try it? **THE BOOB WHEEL CO., Cincinnati, O.**

FOR SALE—The best equipped general shop in the best part of Minnesota. Comprises blacksmith, wagon shop and machine shop, doing a paying business. Reason for selling, too much other business. **H. O. SCHWEER, Mapleton, Minn.**

FOR SALE—Blacksmith shop, two lots, stock and tools, in town of 800 population with two shops, in good farming community. Will sell cheap on account of sickness. **V. M. SRB, Howells, Colfax Co., Neb.**

FOR SALE—Blacksmith shop and dwelling. Also implement shed. One acre of land. Plenty of work for two men. No opposition. Highest prices paid. For full particulars write to **E. WEBSTER, Sanford, Manitoba, Can.**

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FOR SALE—Thriving blacksmithing business in a good country town. Prices are fine here. Will sell very cheaply. Shop 20x50, fine building, well painted and in good condition. Stable and other out-buildings. Four room cottage in good repair, two acres of land, garden and several splendid fruit trees. Write for particulars and prices. **F. H. JOHNSON, Brookston, Ind.**

WANTED—General blacksmith and horseshoer, man capable of ironing new work. Splendid shop to work in with plenty of light and fresh air, fronts on main street. Labor-saving machinery, trip hammer and other machinery run by power, making work as easy as possible. Good tools, large stock, two fires, good size town, German community. Wages $12 to $15 per week to the right man, by the year only. **W. G. FLORA, Forreston, Ill.**

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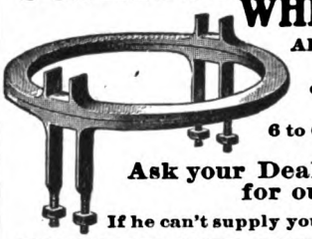
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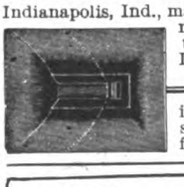
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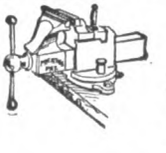


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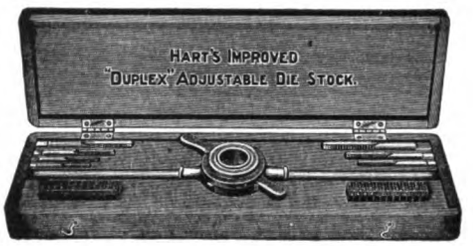
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LONG "S" PATTERNS FOR BLACKSMITHS.

Set of five (5) wrenches fitting nuts on bolts 3/16, 1/4, 5/16, 3/8, 7/16, 1/2 in., 6 1/4 to 10 1/2 ins. long.

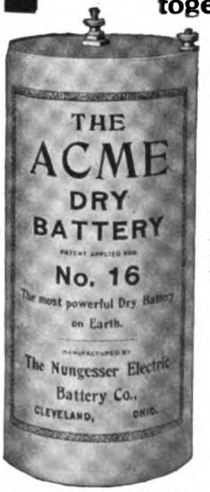
The Whitaker Mfg. Co. CHICAGO.

Do You Have Battery Troubles?

If so you have never used the

"NO. 16 ACME Dry Battery."

The two do not go together.



Nineteen Years of successful Battery making enables us to place upon the market the "Best Ignition Battery" in the World.

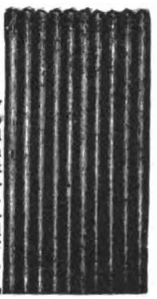
The Nungesser Electric Battery Company,
CLEVELAND, - OHIO.
General Sales Office, 127 W. Jackson Blv'd, Chicago, Ill.

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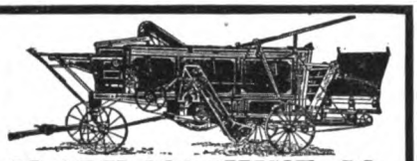
BUTCHER KNIFE BLADES

Made expressly for the blacksmith. Hand forged, tempered and ground, ready for use. 15c. each or $1.50 doz. with handles complete.
TRY A SAMPLE.
Wooodworth Knife Works,
NUNDA, N. Y.

ROOFING



Direct to you from our factory at lowest factory prices. No pay unless you are satisfied that it is better roofing than you can buy anywhere else at the same price. We manufacture a full line of **Galvanized** and **Painted Metal Roofing, Corrugated, V Crimped and Patent.** Ask for free catalog R 29. **The United Factories Co., Cleveland, Ohio.**



CLARK MACHINE CO.
MANUFACTURERS OF
GASOLINE and STEAM **ENGINES**
AND GRAIN THRESHERS.
WRITE for PRICES and CATALOG.
CLARK MACHINE CO.,
ST. JOHNSVILLE, N. Y.

LOTS OF
Neverfail Brazing Compound

have been sold to date without a complaint or kick from one. You may have been caught on cheap fakes for brazing cast iron. If you want something that will do this work simple and strong, give "Neverfail" a trial.

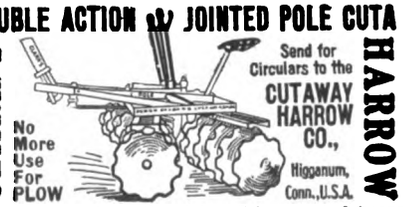
It is made for brazing cast-iron, etc., and does it. Put up in $1.00, $2.00 and $5.00 lots. If your jobber does not handle it, do not take something else. We will send it carrier charges prepaid on receipt of the price.

Manufactured and Guaranteed by
NEVERFAIL BRAZING CO.
Lemars, Iowa.

Cutaway Tools for Large Hay Crops.

Three of **Clark's Intense Cultivators** produced this year on 14½ acres 102, tons of well dried Alfalfa Timothy & Red Top hay. If you want to know how

DOUBLE ACTION JOINTED POLE CUTA



CLARK'S No More Use For PLOW **HARROW**
Send for Circulars to the CUTAWAY HARROW CO., Higganum, Conn., U.S.A.

Jointed pole takes all weight off horses and keeps their heels away from the disks.
Cutaway Harrow Co., 2 Main St., Higganum, Conn.

CLASSIFIED BUYER'S GUIDE.

To Find Address of any Firm given here, consult their advertisement. For its location in this issue, see Index on Page 23.

Anvils.
Columbian Hardware Co.
Columbus Anvil & Forging Co.
Columbus Forge & Iron Co.
Eagle Anvil Works.
Hay-Budden Mfg. Co.
Wiebusch & Hilger.
Peter Wright & Sons.

Automobiles.
Monarch Machine Co.

Auto-Tires and Supplies.
A. H. Kasner.

Axles.
Cleveland Axle Mfg. Co.
National Tubular Axle Co.
Timken Roller Bearing Axle Co.

Axle Box Presses.
Heartley Machine Works.

Axle Cutters.
Holroyd & Co.
Keller Mfg. Co.

Axle Nuts.
Hardware Co.

Axle Straighteners.
W. S. Stedham.

Blacksmiths & Wagon Builders Tools & Supplies.
Barlow Hardware Co.
Beals & Co.
Buffalo Forge Co.
Butterfield & Co.
Campbell Iron Co.
Canedy-Otto.
Cray Brothers.
Cummings & Emerson.
Heller Bros.
E. F. Reece Co.
Standard Tool Co.
Wiley & Russell.
Williams Hardware Co.

Blowers.
Buffalo Forge Co.
Canedy-Otto Mfg. Co.
New Era Electric Co.
Roth Bros. & Co.

Bolt Clippers.
Chambers Bros. Co.
H. K. Porter.

Bolt Cutters.
H. B. Brown & Co.

Books.
F. J. Drake & Co
Gas Power Publishing Co.
Geo. E. Rich.

Bows, Carriage & Wagon.
S. N. Brown & Co.

Brazing Compounds.
Neverfail Brazing Co.

Butcher Knives.
Woodworth Knife Works.

Calks.
Bittenbender & Co.
Franklin Steel Works.
Rhode Island Perkins Horseshoe Co.

Carriage Top Dressing.
Jewel Mfg. Co.

Carriage Specialties.
C. C. Bradley & Sons.
Richard Eccles Co.
The Topliff & Ely Co.

Clamps.
Tudor Mfg. Co.

Clipping Machines.
Coates Clipper Mfg. Co.

Cold File Finish.
Cold File Finish Mfg. Co.

Corundum Wheels.
Pike Mfg. Co.

Disc Sharpeners.
Murray Iron Works.

Drills.
Buffalo Forge Co.
Canedy-Otto Mfg. Co.
Francis Reed Co.
Silver Mfg. Co.

Drill Chucks.
Detroit Twist Drill Co.
Oneida National Chuck Co.

Dry Batteries.
Nungesser Electric Battery Co.

Emery Grinders.
Kerrihard Company.

Emery Wheels.
Chicago Wheel & Mfg. Co.

Fifth Wheels.
Gogel Mfg. Co.
Millersburg Fifth Wheel Co.
National Safety Fifth Wheel Co.

Files & Rasps.
Heller Bros. Co.
Nicholson File Co.

Forges.
Buffalo Forge Co.
Silver Mfg. Co.

Gas & Gasoline Engines.
Air Cooled Motor Co.
Atlas Engine Works.
Alamo Mfg. Co.
Angola Engine & Fdy. Co.
Bauer Machine Works Co.
H. L. Chapman.
Clark Machine Co.
Columbus Machine Co.
Cushman Motor Co.
C. A. Dissinger & Bro.
Allen P. Ely Co.
Fairbanks-Morse & Co.
Gade Bros. Mfg. Co.
Gilson Mfg Co.
Hagan Gas Engine & Mfg. Co.
International Harvester Co.
Kansas City Hay Press Co.
Kenney Machinery Co.
C. P. & J. Lauson.
J. Lauson Mfg. Co.
Lennox Machine Co.
A. Mietz.
Myrick Machine Co.
Nation Engineering Co.
New Era Gas Engine Co.
New Way Motor Co.
Olds Gas Power Co.
Steffey Mfg. Co.
Waterloo Gasoline Engine Co.
Weber Gas Engine Co.
Western Malleable & Grey Iron Mfg. Co.
Williamsport Gas Engine Co.
Woodpecker.

Harrows.
Cutaway Harrow Co.

Hoof Trimmers.
Muncie Wheel & Jobbing Co.

Horseshoes.
American Horseshoe Co.
Bittenbender & Co.
Humane Horseshoe Co.
Phoenix Horseshoe Co.
Powers Rubber Horseshoe Co.
Rhode Island Perkins Horseshoe Co.
Sideweight Horseshoe Co.
U. S. Horseshoe Co.
Whitman & Barnes Mfg Co.

Horseshoe Nails.
Capewell Horse Nail Co.
Fowler Nail Co.
Standard Horse Nail Co.
Union Horse Nail Co.

Horseshoe Pads.
Consolidated Hoof Pad Co
Goodyear Tire & Rubber Co.
Morgan & Wright.
Revere Rubber Co.

Horse Stocks.
Geo. Barcus & Co.

Hub Borers.
Abbott & Co.

Igniters.
Dayton Electrical Mfg. Co.
Henricks Novelty Co.
Hercules Electric & Mfg. Co.
Knoblock-Heideman Mfg. Co.
Motsinger Device Mfg. Co.
Remy Electric Co.
Sherman-Lemke Coil & Supply Co.

Lathes.
Cordesman-Rechtin Co.
Sebastian Lathe Co.
Sidney Tool Co.

Lawn Mower Grinders.
Chicago Wheel & Mfg. Co.

THROW OUT THAT BATTERY



that causes so much trouble on your gas engine, and install an **Apple Automatic Sparker.** No switches, no belts, no batteries for starting or running. A dynamo that produces a strong, steady current and furnishes a fat, hot spark at all times.
Write for information.
DAYTON ELECTRICAL MFG. CO.
152 St. Clair St DAYTON, OHIO.

HOTTEST ON EARTH.
NO. 92 DOUBLE JET TORCH.
For Brazing Wires on Rubber Tires.



GUARANTEED
Jobbers sell at factory prices
$5.00 NET
TURNER BRASS WORKS
63 N. Franklin St,
Chicago, Ill.

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Henricks Novelty Co.
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Knoblock-Heideman Mfg. Co.
Motsinger Device Mfg. Co.
Sherman-Lemke Coil & Supply Co.

Malleable Wagon Standards.
A. H. Harshbarger.

Neckyoke Centers.
E. B. Adams & Son.
Ziegler Neckyoke Co.

Nuts.
Hardware Co.
Milton Mfg. Co.

Paints & Varnishes.
Buckeye Paint & Varnish Co.
Felton, Sibley & Co.
Hardin-Hatton Co

Patent Attorneys.
Chandlee & Chandlee.
Watson E. Coleman.
Franklin H. Hough.
Hensey & Gough.
H. W. T. Jenner.
R. S. & A. B. Lacey.
C. L. Parker.
Milo B. Stevens & Co.
Washington Patent Co.

Power Hammers.
Grinnell Mfg. Co.
Hathorn Foundry & Mach. Co
Hawkeye Mfg. Co.
Kerrihard Company.
Macgowan & Finigan.
Nebraska Mfg. Co.
Novelty Iron Works.
Standish Machine & Supply Co.
Vulcan Iron Works.

Pulley Breaking Bridles.
Prof. Jesse Berry.

Punches.
Armstrong-Blum Mfg. Co.
Badger State Machine Co.
Bertsch & Co.
Buffalo Forge Co.
Excelsior Tool & Machine Co.
Handy Tool Co.
Little Giant Punch & Shear Co.
New Doty Mfg. Co.
Rock River Machine Co.

Roofing.
The United Factories Co.

Rules.
L. S. Starrett & Co.

Saws, Band.
Chicago Wood Working Machinery Co.
Crescent Machine Co.
J. M. Marston & Co.
Sidney Tool Co.

Saw Blades.
West Haven Mfg. Co.

Schools.
American School of Correspondence.
International Correspondence School.
Rose Polytechnic Institute.
Wenthe R. R. Correspondence School.

Screw Plates.
W. L. Brubaker & Bro.
Butterfield & Co.
J. M. Carpenter Tap & Die Co.
Hart Mfg. Co.
Holroyd & Co.
E. F. Reece Co.
Wells Bros. Co.
Wiley & Russell Mfg. Co.

Shafts.
Metal Stamping Co.

Shaft Couplings.
C. C. Bradley & Son.
Richard Eccles Co.

Shaft Supports.
Racine Merchandise Co.

Shears.
Armstrong-Blum Mfg. Co.
Badger State Machine Co.
Bertsch & Co.
Buffalo Forge Co.
Heartley Machine Works.
Little Giant Punch & Shear Co.
New Doty Mfg. Co.
Rock River Machine Co.

Springs.
E. B. Adams & Son.
Harvey Spring Co.
Raymond Mfg. Co.
Racine Economy Spring Co.

Steel Stamps.
A. C. Gibson.
Geo. M. Ness, Jr.

Steel.
Bourne Fuller Co.
Firth Sterling Steel Co.

Steel Shapes.
Crescent Forge & Shovel Co.

Stocks & Dies.
Butterfield & Co.
Carpenter J. M. Tap & Die Co
Canedy-Otto Mfg. Co.
Hart Mfg. Co.
E. F. Reece Co.
Wells Bros. Co.
Wiley & Russell.

Tenoning & Boring Machines.
Vulcan Iron Works.
A. A. Wood & Sons Co.

Threshers.
Clark Machine Ca.

Tires, Rubber.
Goodyear Tire & Rubber Co.
Morgan & Wright.
A. H. Kasner.
Sweet Tire & Rubber Co.

Tire Heaters.
Gogel Mfg. Co.

Tire Setters.
Brooks Tire Machine Co.
House Cold Tire Setter Co.
Henry Mayers Machinery Co.
Standard Tire Setter Co.
West Tire Setter Co.

Tire Shrinkers,
Buffalo Forge Co.

Tongue Supports.
Racine Economy Spring Co.

Tops & Trimmings.
Buob & Scheu.
Cray Bros
Indiana Top & Vehicle Co.

Torches, Brazing.
Turner Brass Works.

Transfer Signs.
Palm Fechteler Co.

Tuyere Irons.
Hoosier Forge Co.
Thompson Tuyere Iron Co.

Twist Drills.
Detroit Twist Drill Co.
Morse Twist Drill Co.
Standard Tool Co.
Whitaker Mfg. Co.

Vehicles.
Barnett Carriage Co
Buob & Scheu.
C. Bush.
James & Meyer Buggy Co.
New Eureka Carriage & Harness Co.
Rochester Vehicle Co.

Veterinary Remedies.
Church Bros.
Eureka Mower Co.
Mineral Heave Remedy Co.
Newton Horse Remedy Co.
O. K. Stock Food Co.

Vises.
Columbian Hardware Co.
Eagle Anvil Works.
Chas. Parker Co.
Prentiss Vise Co.

Wagon Brakes.
Keller Mfg. Co.

Welding Compounds.
Cortland Welding Compound Co.
Perfection Welding Compound Co.

Welding Plates.
Phillips-Laffitte Co.

Whiffletrees.
A. M. Wood Co.

Wheels.
Carriage Wheel Supply Co.
Boob Wheel Co.
Muncie Wheel & Jobbing Co.

Wheels, Metal.
Electric Wheel Co.
Empire Mfg. Co.

Wood Working Machinery.
Cordesman-Rechtin Co.
Crescent Machine Co.
J. M. Marston & Co.
Parks Ball Bearing Machine Co.

Wrenches.
Tudor Mfg. Co.



MINERAL HEAVE REMEDY
CURES HEAVES
Neglect Will Ruin Your Horse
Send today for only
Permanent CURE
Safe-Certain
$3 PACKAGE will cure any case or money refunded
$1 PACKAGE cures ordinary cases. Postpaid on receipt of price. Agents wanted.
Write for descriptive booklet.
MINERAL HEAVE REMEDY CO.
418 FOURTH AVENUE. PITTSBURG, PA.

EXTENSION AXLE NUTS CURE WABBLES. Make old buggies run like new; very profitable for agents. Exclusive Territory.
HARDWARE CO., BOX 810, PONTIAC, Mich.

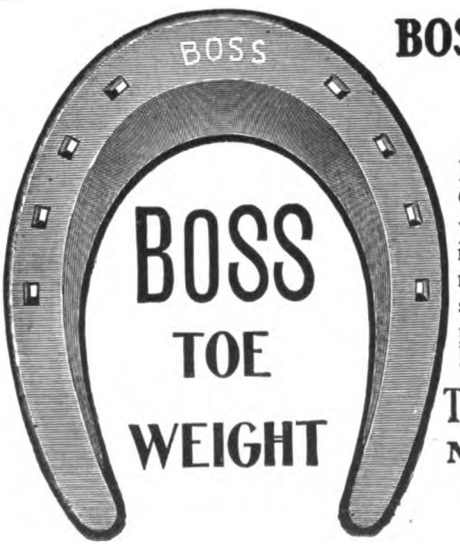
PATENTS
TRADEMARKS, COPYRIGHTS, PRINTS and LABELS
and full information pertaining thereto given in our handsome "PATENT BOOK." SENT FREE ON REQUEST.
HENSEY & GOUGH
PATENTS "THE KEY TO SUCCESS"
HENSEY & GOUGH
122 BROADWAY
NEW YORK CITY

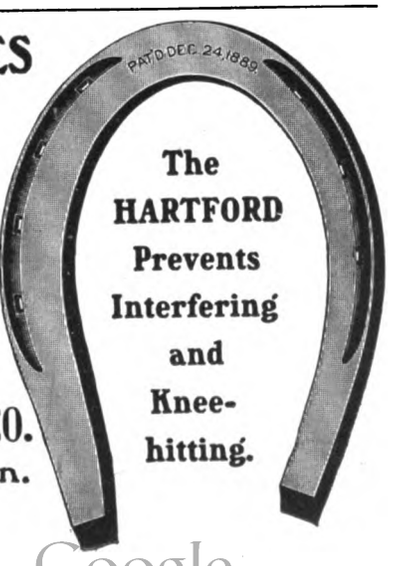
Rough-On-Flies.
Every gallon guaranteed. Upon receipt of $2 we will send one gallon and a good sprayer by express prepaid. After using half the oil, if not satisfactory, upon receipt of notice, we will refund the money and receive back the sprayer and can, paying return charges.
EUREKA MOWER CO., UTICA, N. Y.

NO. 6½ CONCORD EXPRESS AXLES
For High Grade Delivery Wagons and Trucks.
Sold by Leading Heavy Hardware Jobbers.
CLEVELAND AXLE MANUFACTUR'G CO.
Canton, Ohio.

GASOLINE ENGINE
BARGAINS
All leading makes. All sizes. Get our list of bargains before you buy an engine. We can save you money.
ALLEN P. ELY CO.
OMAHA, NEB.

BOSS AND HARTFORD SHOES
CARRIED IN STOCK BY ALL LEADING DEALERS
Have the highest reputation among the trade. Conceded to be the best sideweight and toeweight shoes made in this country. Cost same as inferior makes. Mean less labor. Are far superior to a hand made shoe and always give good satisfaction. Sold by all leading jobbers. Sample pair sent post paid for 50 cents. Send for circulars. They are free. X X X
THE SIDEWEIGHT HORSESHOE CO.
Mechanic Street, Hartford, Conn.





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Trade Literature and Notes.

AN EXCELLENT CHANNEL STEEL has been put on the market by William Hjorth & Company of Jamestown, N. Y. This steel is said to be best for the purpose, tempers at a low heat, is tough and holds its edge. Our friends who are interested in this line will receive full information by addressing this firm as above.

THE BOOB WHEEL CO., of Cincinnati, O., have bought out the Dexter Spring & Gear Co., of Pittsburg, Pa., and the well known Dexter Spring will now be manufactured at Cincinnati. The Boob Wheel Co. advise us that they are able to furnish customers with all parts of the old style King & Queen gear.

A VALUABLE PATENT BOOK is published by Hensy & Gough of 120 Broadway, New York City, leading solicitors of U. S. and foreign patents. This book contains valuable information on how to proceed in securing a patent and gives the inventor many helpful tips and valuable ideas. You can get a copy of the book free by writing to the above address.

AN ANNOUNCEMENT is made by the Richard Eccles Company of Auburn, N. Y., that patent has been allowed on their clever device for fastening leather bushings into their ball bearing couplings. This firm has issued an interesting little folder on this device and will gladly send this folder to any AMERICAN BLACKSMITH reader upon request.

WOODPECKER GAS ENGINES, manufactured by the Middletown Machine Company, Middletown, Ohio, are very popular among the shop owners, who are installing power these days. The Woodpecker is said to have many advantages over the other engines on the market. These advantages are fully described in a recent catalog, published by the Middletown Machine Co. A copy of this catalog can be had for the asking.

A CATALOGUE OF BLACKSMITH TOOLS, one of the most complete published, containing over 260 pages, has been issued recently by Patterson, Gottfried & Hunter of New York City. It contains illustrations of all kinds of tools and machinery for the blacksmith shop and any shop owner would find it a very valuable reference book. The above named firm has offered to send this book to AMERICAN BLACKSMITH readers free upon request. When writing ask for catalogue No. 119.

ONE OF OUR ADVERTISERS The Kerrihard Company of Red Oak, Iowa, recently built a splendid new two-story factory, 110 feet long and 33 feet wide. The new structure is complete in every detail, having all modern improvements. It is said that this new factory was necessary on account of the increased demand for the well known Kerrihard power hammers, emery wheels and grinders. The Kerrihard Company have been turning out first class machines, carefully constructed and strongly built.

AN INTERESTING ANNOUNCEMENT was made recently by August Mietz of New York City, manufacturer of Mietz and Weiss engines. It seems that the commissioners appointed by the French Government to look into petroleum engines for the French Navy cut their interests on various engines and commenced the Mietz and Weis system and purchased a 22 horse power marine oil engine of this factory which they had under test.

The machine is operated by hand or power will interest this large class of band saw users.

THE R. M. HAMMOND COMPANY OF YELLVALE, KANS., have issued an interesting booklet on their Perfection disc sharpeners with emery stand attachment. The booklet fully describes the operation of the machine, tells of its many advantages and is very interesting reading, especially for the man who intends to improve his equipment with a machine of this kind. Perfection disc sharpeners are sold under a full guarantee. A copy of this booklet will gladly be sent upon request.

ON MARCH 19, 1907, the J. M. Carpenter Tap & Die Co. of Pawtucket, R. I., broke ground for their new factory. The building will be of brick construction, practically fire-proof, covering 24,000 square feet of floor space and increasing their manufacturing facilities seventy-five per cent.

While the company has always been reasonably prompt in filling orders they expect by their increased facilities, to better serve their patrons in the future and will be able to promptly fill all requirements in their well-known line of Tools for Cutting Screw Threads, including taps, dies, die stocks and tap wrenches.

This company started in business thirty-seven years ago and are pioneer machine screw tap makers.

OUR READERS will be interested to note the advertisement of the Monarch Machine Company, of Des Moines Iowa on page 56 of this issue. The auto carriage there illustrated is a carefully constructed machine and sells for the low price of $300.00.

The construction of the carriage is standard, using good heavy wheels and axles. The body is supported on three springs. An angle iron frame is used to mount the engine on together with the other equipment. The body is attached to this angle-iron frame with four bolts. The engine used is a 4 H. P. four cycle air-cooled engine and the transmission is of the planetary type with two speeds forward and one reverse. This transmission is mounted on the engine shaft and when the high gear is in the drive comes direct on the engine shaft, which drives the rear wheel by means of a chain, shown in the cut. The low speed, high speed and reverse are all operated from one lever at the side of the seat. A tilted steering wheel is used and the spark and throttle levers are placed directly under the wheel on the steering shaft.

Further information can be had by addressing The Monarch Machine Co., Des Moines, Iowa.

IT IS A WELL KNOWN FACT among horse owners that heaves is increasing. In spite of the greatest precaution and attention, quite often a well cared for animal will, without apparent cause, suddenly present aggravated and advanced symptoms.

S. Bennington & Sons, proprietors of the Volga Stock Farm, breeders and dealers at Elkader, Iowa, recently had an experience which is interesting because of the facts. On March 11th, this year, they say: "We have cured four horses of heaves and they sold for sound horses."

David Diver, Verona Sta., Oneida Co., N. Y., on Feb. 11th last said: "My horse is entirely over the heaves. Last June I would have sold him for $50. Now he isn't for sale at any price. I now drive him in thirty-five minutes the same distance that last June would have taken an hour and a half."

These two letters were received by the Mineral Heave Remedy Co. Pittsburg Pa., who are selling their valuable remedy all over the country. The remedy is offered in one and three dollar packages, the latter size guaranteed to cure any case of heaves of any length standing or severity.

Many blacksmiths throughout the country sell Mineral Heave Remedy and universally report ready and steady sales and satisfactory results.

Orders can be sent direct or full information obtained from The Mineral Heave Remedy Co., Pittsburg, Pa.

USE OF ELECTRICITY IN THE BLACKSMITH AND WAGON MAKERS SHOP.—Enterprising blacksmiths and wheelwrights are always open to discussion showing the advantages to be obtained by the use of modern machinery in the equipment of their shops.

The blacksmith and wagon maker proprietor who lacks ambition and who very seldom devotes any time to the reading of valuable periodicals like the AMERICAN BLACKSMITH fails to realize that he is behind the times and thus losing money. His men are dissatisfied, his competitor is making money and he is perplexed to determine why he does not advance. The solution of the whole problem lies in the fact that his competitor invests his money judiciously in appliances that bring results. Necessarily his competitor obtains more satisfaction from his men by using power appliances that eliminate all unnecessary physical strain.

At the time the gas or gasoline engine was introduced into blacksmith and wagonmakers use quite a relief was experienced. This relief is more than doubled, however, since the introduction of electricity. The Electric Forge Blower and Electric Motors give still better resblts. The care incumbent with the use of the engine is dispensed with. No time is lost in starting the machine in motion. All is at the command of the operator by means of a small switch or push button. Where electricity is used the proprietor as well as the employee is saved from uneasiness.

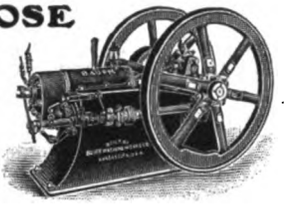
Many blacksmiths and wagonmakers are slow to consider electrical Forge Blowers, etc., owing to their unfamiliarity with electricity and a predominant feeling of timidity in its use. This is all the result of a false impression and Roth Bros. & Co., Chicago, Ill., desire to impress this upon such parties. They will gladly give detailed information on the advantage of electric blowers to any of our readers.

YOU LOSE

If you fai to investigate our proposition before buying

That Engine.

BAUER MACHINE WORKS COMPANY
115 W. 18th St.
Kansas City, Mo.





A low wagon at a low price. Handy for the farmer. Will carry a load anywhere a horse can travel.

Low Down Wagons

soon earn their cost on any farm.

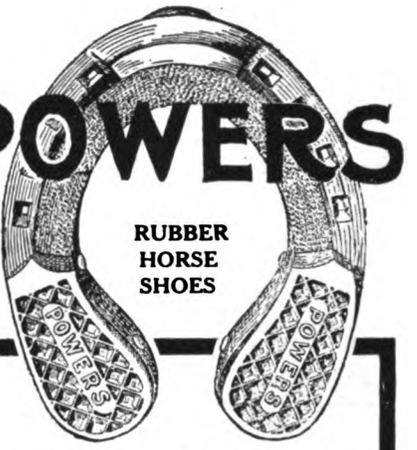
Steel Wheels

for farm wagons. Straight or staggered spokes. Any size wanted, any width of tire. Hubs to fit any axle. For catalogue and prices, write to

Empire Mfg. Co., Box 300, Quincy, Ill.



POWERS



DO YOU KNOW WHY Powers Rubber Horse Shoes ARE THE BEST?

BECAUSE: They are the most DURABLE.

BECAUSE: They are made of the best drop forging, and part rubber and rubber fibre, which prevents slipping on either dry or wet pavement.

BECAUSE: They do not break off at the heel, and wear even until worn out.

BECAUSE: They lessen concussion.

BECAUSE: They prevent corns.

BECAUSE: They save contracted heels.

BECAUSE: They prevent sprains.

FOR SALE BY

LEADING DEALERS EVERYWHERE

ASK TO SEE THEM

POWERS RUBBER HORSE SHOE CO.

CHICAGO, ILL.

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New Books.

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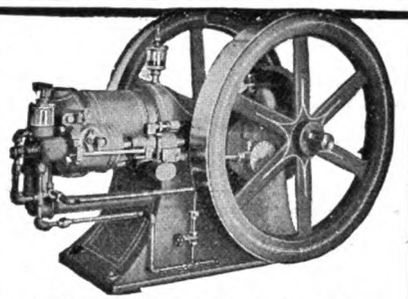
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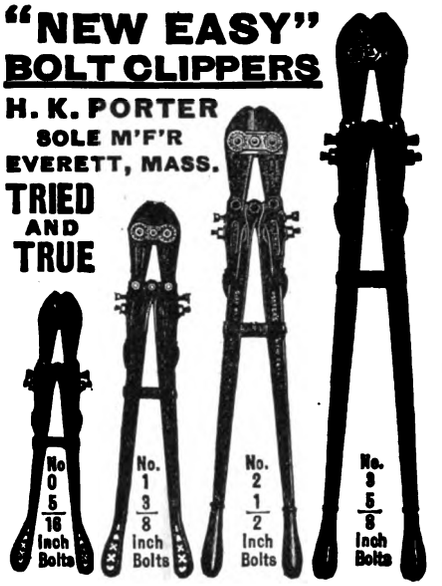
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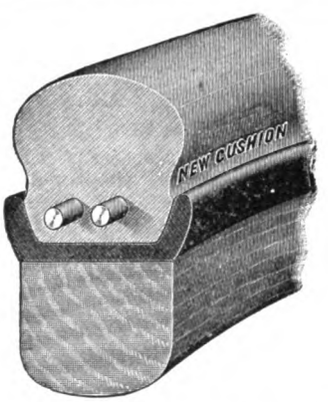
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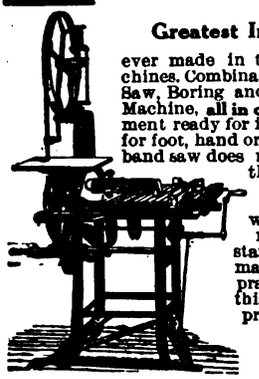
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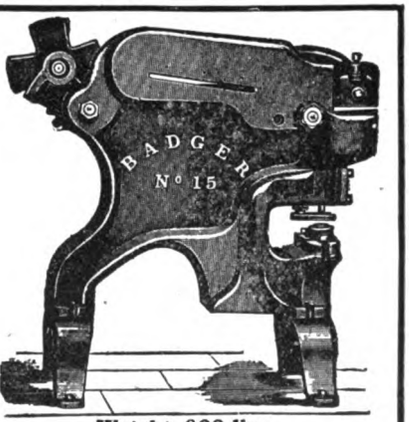


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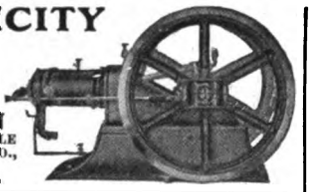
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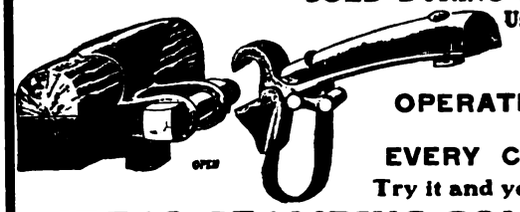
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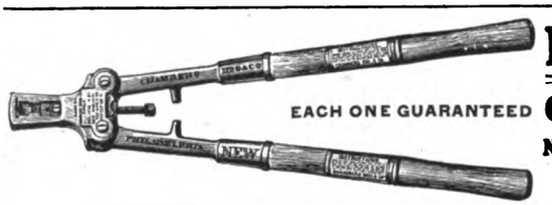
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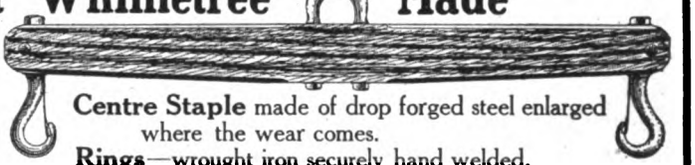


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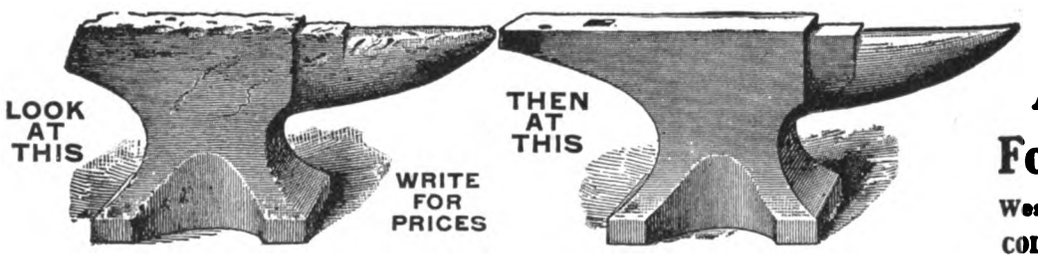


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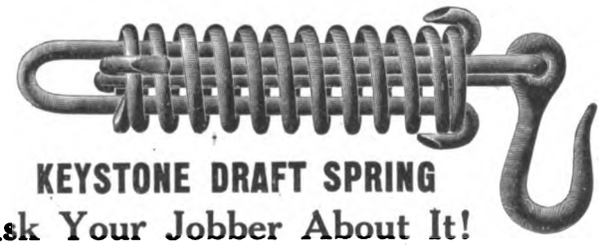
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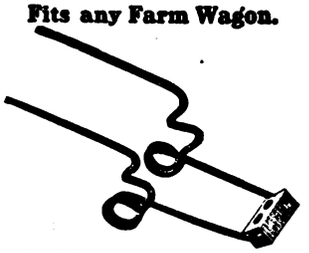
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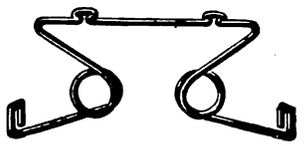
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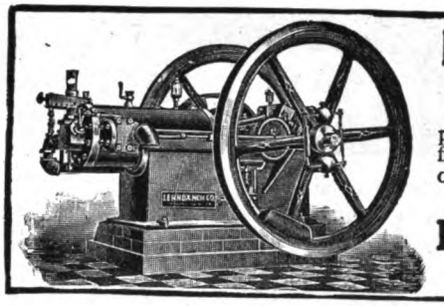


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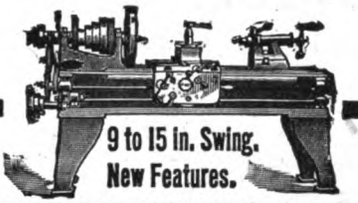
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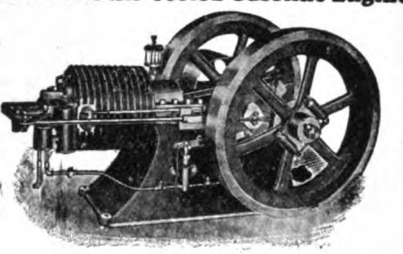
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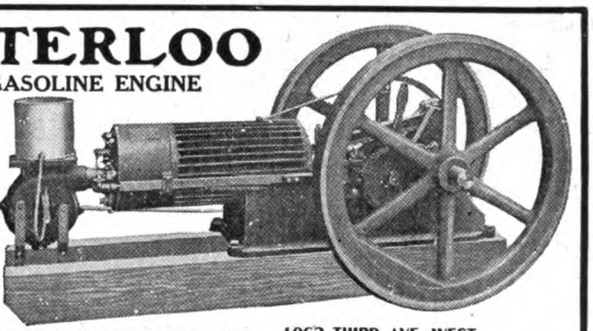
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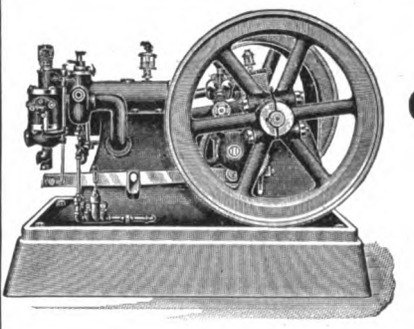
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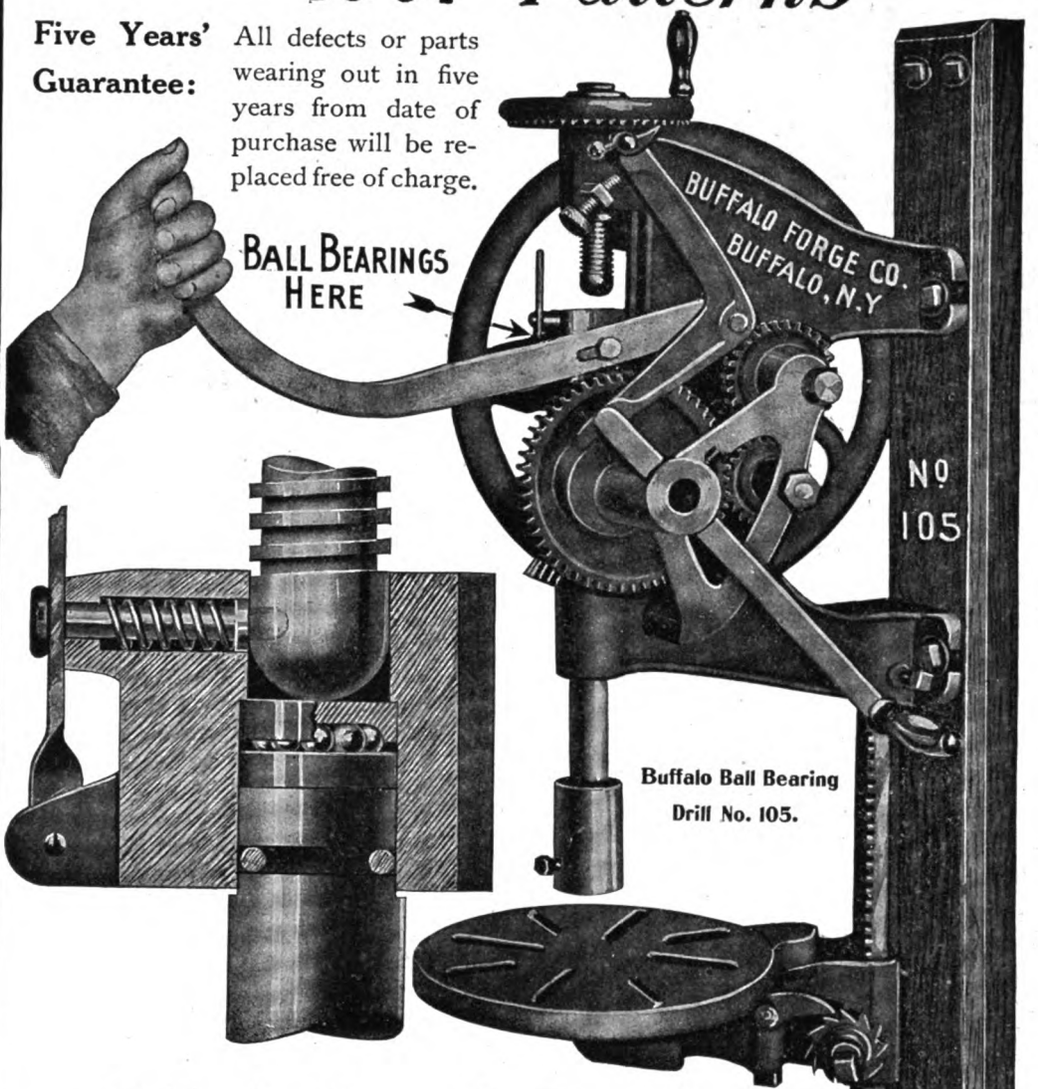
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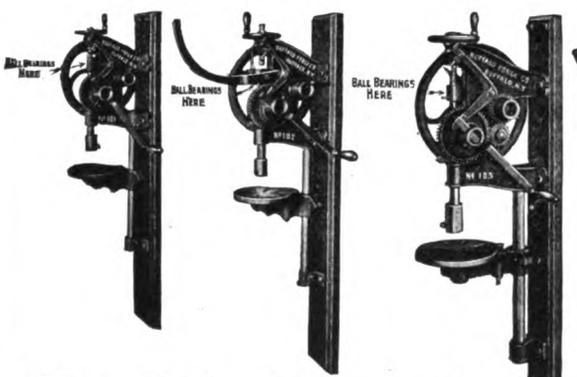
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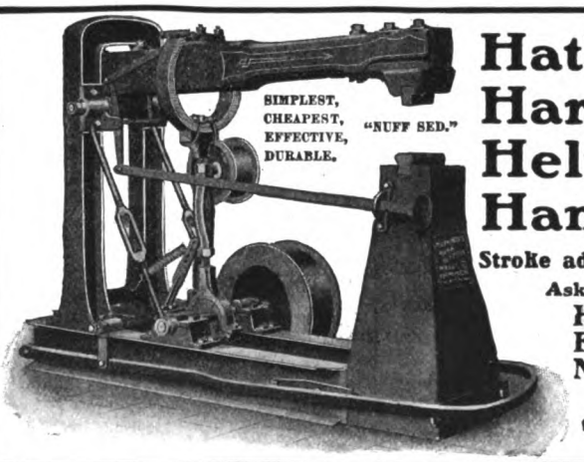
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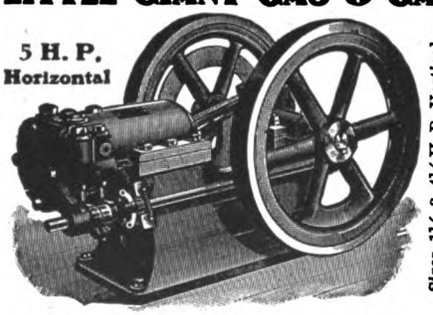


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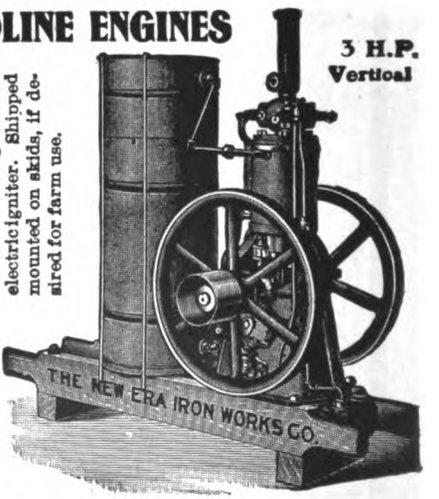
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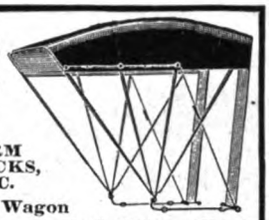
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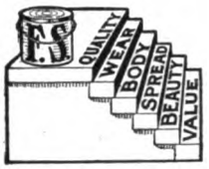
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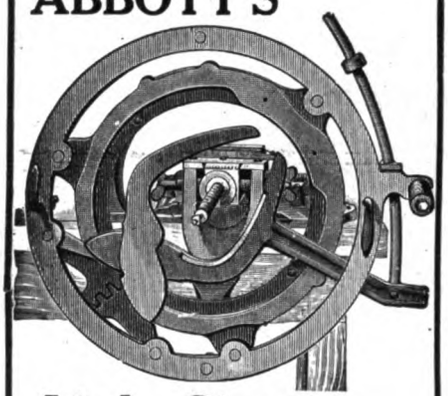


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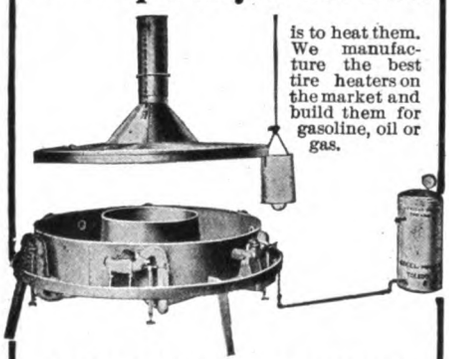


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THE PERFECT POWER HAMMER

Made in 3 sizes.

Only one horse-power to run it. The best Trip Hammer in the U. S., by reason of its simple construction, efficiency and durability. Used exclusively by some of the largest carriage builders in the country.

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Always the same report.

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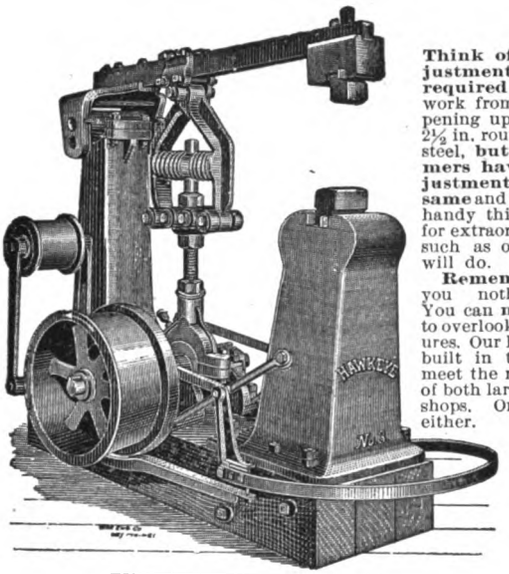
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less than any other power hammer on the market of equal QUALITY and CAPACITY



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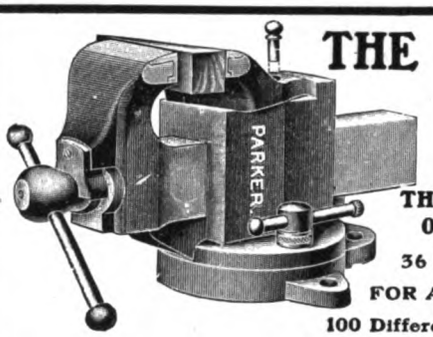
Remember, it costs you nothing extra. You can **never** afford to overlook these features. Our hammers are built in two sizes to meet the requirements of both large and small shops. One H. P. runs either.

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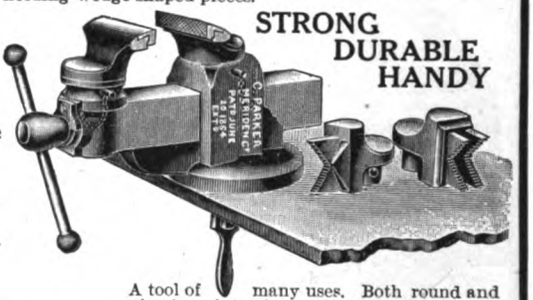
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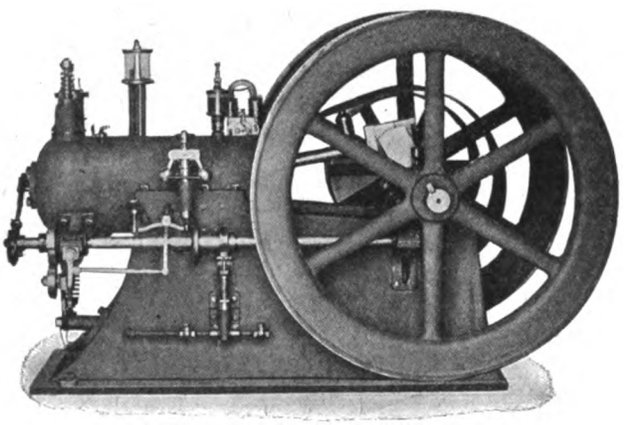
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A tool of many uses. Both round and pipe jaws interchangeable. Weight, 76 lbs.

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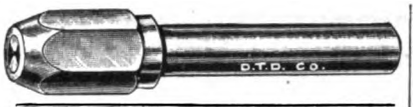
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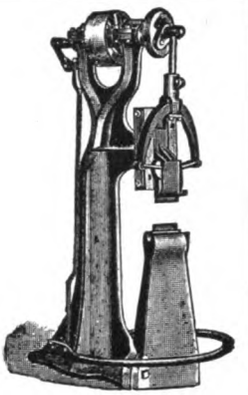
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Universal Tenon AND Boring Machine

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Only perfect adjustable stroke, operated entirely by treadle.





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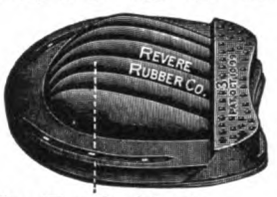
The Pneumatic Cushion next shoe when in contact with the ground forms a vacuum which positively prevents slipping.

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AIR CUSHION RUBBER HORSESHOE PADS



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It fills with air at each step. That's what breaks concussion. That's what prevents slipping. That's what keeps the foot healthy. That's what cures lameness.

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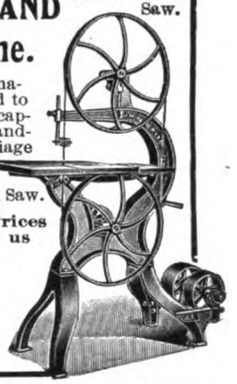
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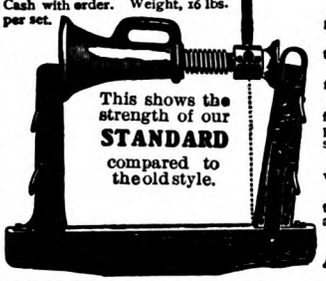
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We make the following sizes:

No. 1, 3	in. wide, 14	in. high
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Price, $1.65 per set of 4 stks
Cash with order. Weight, 16 lbs. per set.



This shows the strength of our **STANDARD** compared to the old style.

The Bruce Malleable Wagon Standard

This Malleable Iron Bolster Standard has been tested thoroughly, and we guarantee it strictly as represented.

Anyone familiar with the farm wagon will readily see the great advantages of the Malleable Iron Bolster Standard over the old style.

1. Made of the best grade malleable iron. It has been thoroughly tested by factories and wagon makers and pronounced a great success.

2. It is attached to bolster by means of two bolts passing through bolster from the side, and one bolt from top to bottom of bolster, thus holding standard perfectly solid, and at the same time strengthening end of bolster, which in old style is weakened by mortise.

3. The Malleable Iron Standard has a 3 1-2 in. face at base, which prevents wear on wagon box, while the old style has only a 7-8 inch face.

4. Great time saver. Can be attached to bolster in one-fourth the time required to put on wood stake. Adapted to new and repair work. The price will justify all classes of the trade in using this standard.

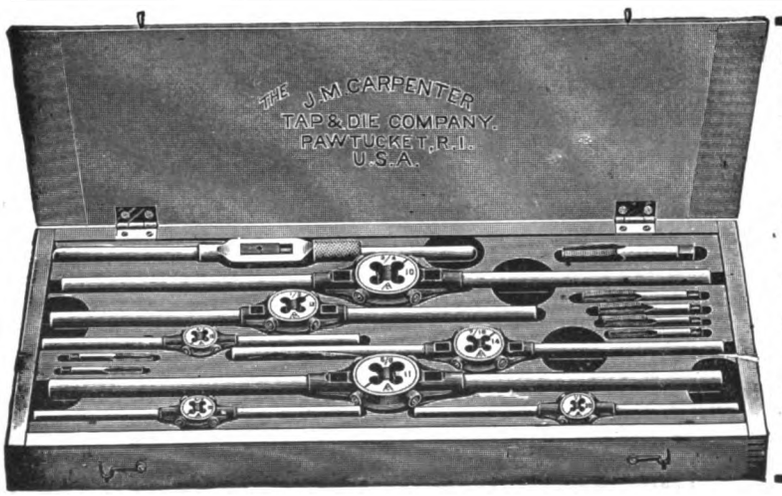
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$1.00 per Box, by Mail. For Horses and Cattle.



CARPENTER'S NEW FULL MOUNTED DIE SETS

With a stock for each die and the Original Nichols Tap Wrench.

Before buying a die set you should see **Carpenter's** and you will have no other make.

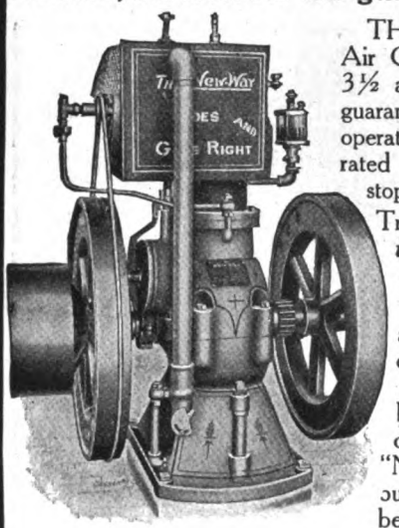
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Try to get that guarantee ***in writing*** on any other engine.

No water tank to fill and empty every winter day, one piece cylinder, no packing to leak and blow out, and twenty other reasons why the "NEW WAY" Engines outlast others and are best for Blacksmiths.

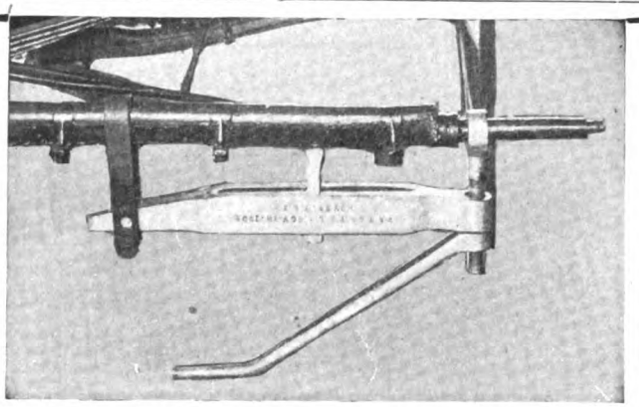
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to learn a good livelihood in the Navy, or to complete the trade which they have commenced. The Artificer School maintained by the Navy gives a thorough course of instruction in the various artificer trades; separate Electrical Schools. The pay of artificers ranges from $30 to $70 a month, with wholesome food, lodging, medical attendance if needed, and $45 outfit of clothing FREE. Apply to any Navy Recruiting Station, or if there is none in your vicinity, write to

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A Labor and Time Saving Machine that does its work perfectly.

For setting or straightening Buggy Axles and all vehicles having a steel axle. Also Pitman rods of mowers, reapers and binders, bent rods and shafts in section harrows, cultivator beams, shaftings, etc.

The axle can be straightened in the vehicle **cold**, better than to take it out and heat it, and in one-tenth the time. Saves all the trouble of taking the axle out. No scarring of the wood or breaking of the paint.

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Mr. E. A. Glenn of Rockwall, Texas, is one of the many satisfied users. He writes as follows:

Dear Sir:—The "Cold Axle Setter" that I bought from you, does the work splendidly. It is the best investment I ever made in my shop.

Further particulars on request. Or will ship at once on receipt of price, $10.00.

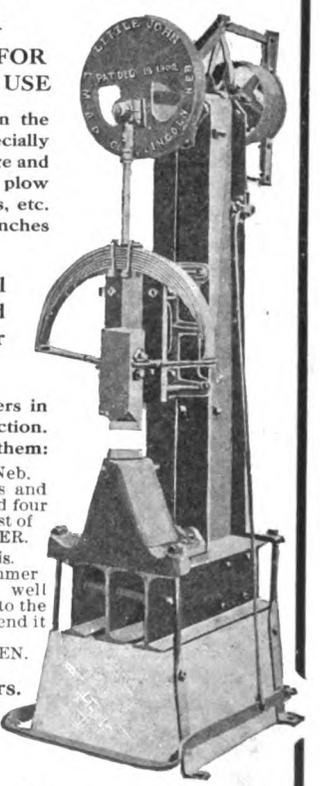
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DESIGNED ESPECIALLY FOR GENERAL BLACKSMITH'S USE

The dies are set at an angle of 45° in the head which adapts the hammer especially for welding tires, springs, axles, bridge and structural rods and for sharpening plow lays, cultivator shovels, grader blades, etc. You can weld a piece of steel five inches square with it.



The "LITTLE JOHN" will strike a 900 pound blow and take less than one horse power to run it.

There are nearly 400 of these hammers in use today, every one giving satisfaction. Here's what our customers say about them:

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"I have bought one of your hammers and am well pleased with it. I have operated four hammers and I think yours run the best of them all." ANDREW SCHAUPNER.

Wrightstown, Wis.

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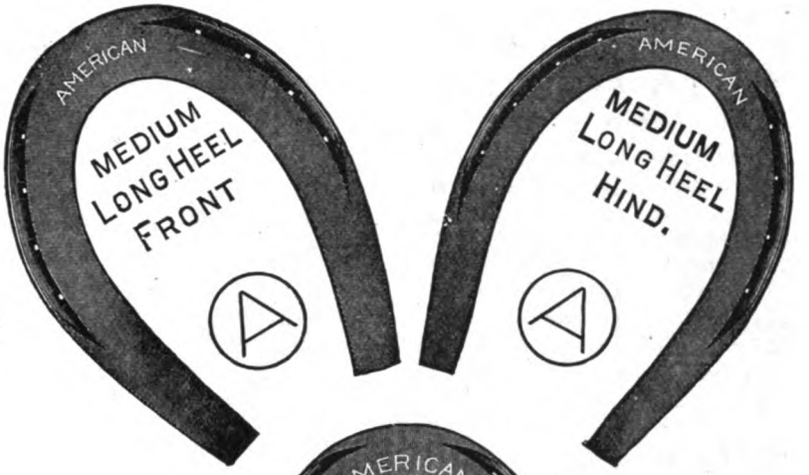
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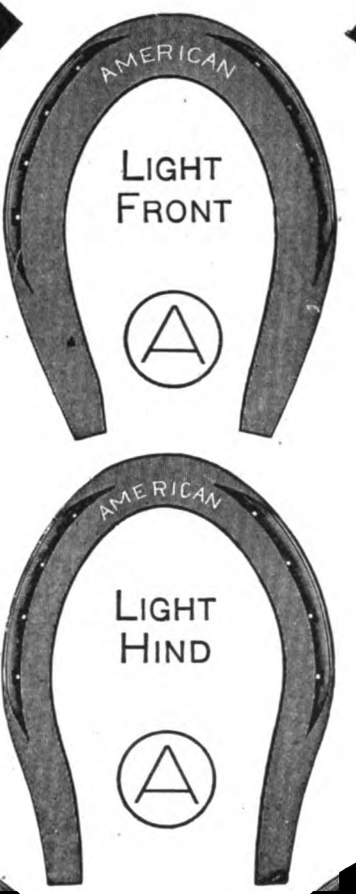
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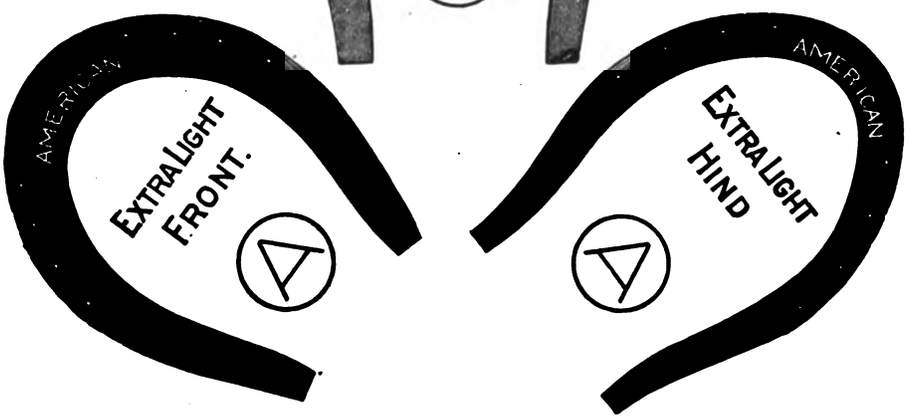
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FIND THIS TRADE MARK STENCILED IN RED ON ALL KEGS and BOXES

We manufacture horse shoes of all descriptions and have the most complete line for you to select from. Write for a copy of our illustrated catalogue. It will be sent to you free on request.



Our shoes take less coal and last for per keg to fit up than any other shoe made. Try it. We guarantee every one to be made of first class material and by skilled workmen. Our shoes give satisfaction always



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AMERICAN HORSE SHOE CO.

PHILLIPSBURG, NEW JERSEY, U. S. A.

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YOU'RE TIRED AND WORN OUT
FROM USING THAT OLD STYLE HAND BLOWER.
GET A MODERN ELECTRIC
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AND ENJOY LIFE.
WRITE FOR INTERESTING PRIES AND BULLETIN NO. 1611
ROTH BROS., 27 So. Clinton St., CHICAGO, ILL.

ONLY 60 CENTS Did you ever try to shoe a horse that would not stand still? By the use of my great **Pulley Breaking Bridle** you can make the most restless horse stand as quiet as a lamb—even ugly horses, stallions, etc., completely subdued while being shod. Price, **Only 60c postpaid.** You should own one. Will bring business to you. Send for circular telling all about it.

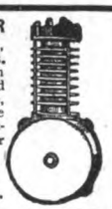


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BUILD YOUR OWN GASOLENE MOTOR

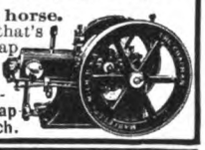


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1 1-2 horse tested to 2 horse.
He wanted a good one, that's why he didn't buy the cheap kind, but bought the simplest, strongest, and best designed, for the lowest possible price of H.L.Chapman, Box A, B. Marcellus, Mich.



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DRILL CHUCK



Made entirely of steel, especially for blacksmithing and carriage work. Positive, strong and self-cleaning. Casts no shadows. Will save cost over other chucks in the saving of time. Money refunded if not as represented. Ask your jobber for it or send direct for prices and circulars. The best is the cheapest. The Oneida National Chuck Co., Oneida, N.Y., U.S.A.

ZIEGLER NECKYOKE CENTERS
the only practical lock neckyoke on the market. None better for safety and durability. Very handy for repair work. Have you tried them? Ask your jobber for them.

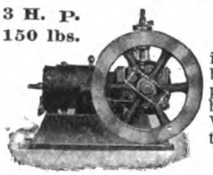


Descriptive circulars free.
THE ZIEGLER NECKYOKE CO., Coffeyville, Kas.

VEHICLE and HOUSE **PAINT**
Get our color cards and prices.
HARDIN-HATTON CO.
FT. WAYNE, IND.

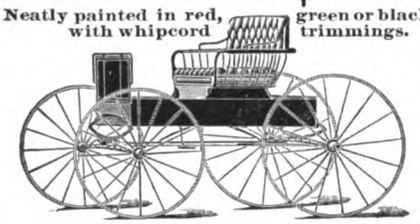
AUTO TIRES
DON'T OVERPAY
Write today for price. State size wanted. Lamps at ¼ what others charge.
A. H. KASNER, 152 Church St. N. Y. City

3 H. P.
150 lbs.



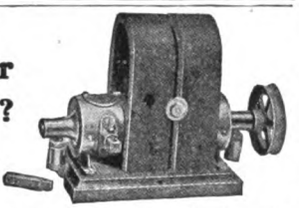
THE 1907
CUSHMAN
is just the power for the blacksmith. Many improvements. Simple, durable and reasonable in price. Write for new catalog if interested. Marine or stationary
Cushman Motor Company, Lincoln, Neb.

Runabout for $25.00
Neatly painted in red, green or black, with whipcord trimmings.



WE MAKE THE PRICE on a complete line of vehicles. Special prices made to American Blacksmith readers. **Write for our big Catalogue. FREE TO YOU.**
New Eureka Carriage & Harness Co., CINCINNATI OHIO,

Why Not Stop Your Troubles?
"A Wizard Tubular" Does It.



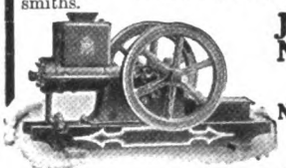
Armature incased in WATER-PROOF non-corroding brass tube.
All brass screws. Friction, Belt or Governor drive.
Brush-holders removed without loosening screws.
All parts polished brass. Contact and Jump Spark.
A TRIAL WILL CONVINCE YOU.
Most popular and satisfactory Magneto on the market.
Price as popular as Machine.
GOVERNOR DOES AWAY WITH BATTERIES AND SWITCHES.
HERCULES ELECTRIC & MFG. CO.
701 Langsdale Ave., INDIANAPOLIS, IND.
Write for catalogue and SPECIAL OFFER.

GOES LIKE SIXTY
SELLS LIKE SIXTY
SELLS FOR SIXTY
$60
GILSON
GASOLENE
ENGINE
For Pumping, Cream Separators, Churns, Wash Machines, etc. FREE TRIAL
Ask for catalog—all sizes



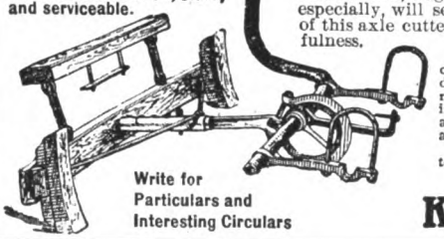
GILSON MFG. CO. 39 Park St. Port Washington, Wis.

LAUSON
THE EASY STARTING ENGINE OF HONEST HORSE POWER. We have proved by tests that the "LAUSON," easy starting engines work equally well on gasoline or alcohol. Less cost; less water to cool; one-third the parts; made in all sizes for all purposes. **Guaranteed absolutely** for one year. Write for big catalog. **IT IS FREE.** We have an interesting proposition to blacksmiths.



J. LAUSON MFG. CO.
DEPT. F,
New Holstein Wis.

KELLER ECCENTRIC BRAKE
Warranted to lock wheels with three ton load with ease; can be applied to any wagon. Works without aid of rachet. Made in two sizes.
Note its construction, sturdy and serviceable.



Blacksmiths, wagon and buggy repairers especially, will see at a glance the merits of this axle cutter and appreciate its usefulness.
It will cut a pipe, boiler tube or shaft, as little or as much as desired and do its work accurately, taking the merest shaving from the end or cut in two at any point, its bearings being all on one side of the knife.
Attractive proposition offered to live agents.
Write for Particulars and Interesting Circulars



Rod Pipe and Axle Cutter
Write for details
Keller Mfg. Co. Sauk Centre, MINNESOTA.



COLD FILE FINISH
PREPARED EXCLUSIVELY FOR HORSE SHOERS
TRADE MARK

COLD FILE FINISH IS A TIME AND LABOR SAVER AND WILL BRING YOU MORE BUSINESS IF YOU USE IT. READ THIS LETTER:

Winsted, Conn, May 8, 1907.

Cold File Finish Co., Toledo, Ohio.

Gentlemen: Enclosed find money order for five dollars for which send us seven cans Cold File Finish. The last seven cans we got are not all used yet but are going fast. We have four fires and each fire has a can now, so you can see you do not want to delay the shipment. **It is the best labor saver we have run up against yet.**

Yours truly, JOHN DARCEY & SON.

We receive letters like the above every day from satisfied users of **COLD FILE FINISH.** Are you one of them? You cannot afford to be without it. Booklet and testimonials sent on request.

Price, 75c a can or seven cans for $5.00. EXPRESS PREPAID.

COLD FILE FINISH MFG. CO., Box 45, TOLEDO, OHIO.
STATION C.

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COATES ELECTRIC CLIPPER

Clip your horse and sharpen his toe calks with the same machine. Move the light clipper around, no need to move the horse. You should know all about **Coates Flexible Shaft Machine.**

Send for Book A. B.

COATES CLIPPER MANF'G CO.,
WORCESTER, MASS.

HAND MADE TOP BUGGY $55



119 Special.

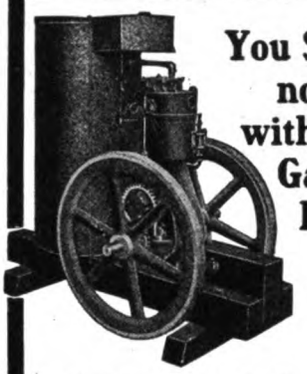
Long Distance Axles, Bradley Couplings, Full Rubber Top, Wide Seat, Heavy Trimmings.

No better wagon was ever built for the money. It is strong and durable, beautifully finished and worth $75.

WE SEND IT ON 30 DAYS FREE TRIAL.

Send postal card for our **Free Carriage CATALOG**, with over 70 different styles, and Wholesale Price List.

ROCHESTER VEHICLE CO.
366 Main St. East,
ROCHESTER, - NEW YORK.



You Should not be without a Gasoline Engine

4 and 6 H. P.

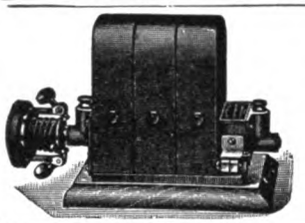
The **"Cray Bros."** Gasoline Engine has been proven by test to be **the most powerful and durable** on the market.

The mechanism is **simplified** as much as possible, and at the same time is made **strong and serviceable,** capable of performing **wonderful feats.**

The price? About **one-half** what others charge for engines of same horse-power.

Send for our FREE 1907 304 PAGE CATALOG.

CRAY **CRAY BROTHERS**
1247 W. Ninth St.
CLEVELAND, OHIO



HENRICKS MAGNETO

Fires your gas or gasoline engine without the aid of batteries.

It is better and more durable than any Dynamo. Its Governor regulates the speed regardless of speed of Fly Wheel. Its Governor adjusts to imperfect Fly Wheels. Its Governor insures a constant and uniform spark. The spark does not burn the contacts of the engine. All strains are removed from the bearings of Magneto. FULLY GUARANTEED. AGENTS WANTED.

HENRICKS NOVELTY CO.
130 S. Capital Avenue ***INDIANAPOLIS. IND.***

MURDER

IN THE FIRST DEGREE!!

This 2½ H. P. Gasoline Engine

That we will sell for a limited time for $48.50 is worth and sold by anyone for $125.00. This is really murdering everybody's price. The engine is furnished complete on skids ready to run.

Second Degree Prices on the 3¾, 5, 6, 8, 10 H. P.
Get next quick.

C. A. DISSINGER & BRO., WRIGHTSVILLE, YORK CO. PA.



In the Natural State

the hoof of the horse comes in contact with Mother Earth and is perfectly bare. This condition permits free access of natural moisture and fresh air to the frog and other parts of the hoof and the hoof being bare, the frog can expand.

For the horse in service it is necessary to protect the hoof from contact with hard roads, and the closer we can stick to nature and yet give the necessary protection, the better for the horse.

Of all hoof protections the "W & B" Rubber Pad Shoe is undoubtedly the best because, being open, it does not cover the hoof, but permits the natural moisture and fresh air to reach the frog and other parts, keeping the hoof healthy, and as the heavy rubber pads at the heel are resilient, and the shoes do not cause the frog to contract, but rather allows it to expand as nature intended.

The protection is ample, as the frame of the shoe is drop forged from steel, and the channels, both upper and lower, are filled with high grade rubber, thoroughly vulcanized.

The "W & B" Rubber Pad Shoe is fitted cold and applied much quicker than the iron or steel shoe; therefore the shoer increases his profit by using it.

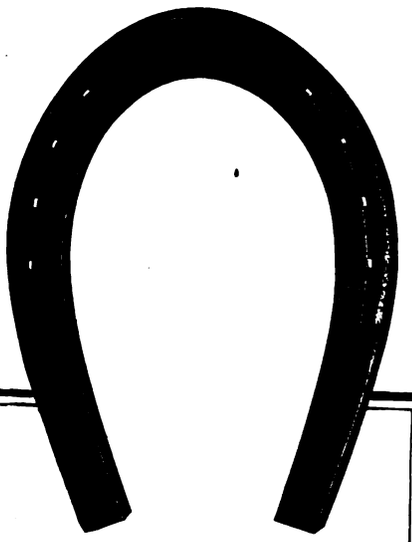
Carried in stock by all of the leading Blacksmith Supply Houses.

If your jobber does not carry it, write us.

The Whitman & Barnes Mfg. Co.

GENERAL SALES OFFICE,
CHICAGO, ILLINOIS

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WHEN YOU BUY HORSE SHOES

Is it not preferable to make your selection from the most complete line and the best shoes on the market?

UNITED STATES HORSE SHOES

"In a Class by Themselves"

OUR Illustrated Catalogue shows all sizes and patterns. The book is free. We will gladly send a copy to your address. Write today

We are giving away a handsome souvenir stick pin to every smith who sends his name and address. Did you get one? Don't wait until they are gone. Write today.

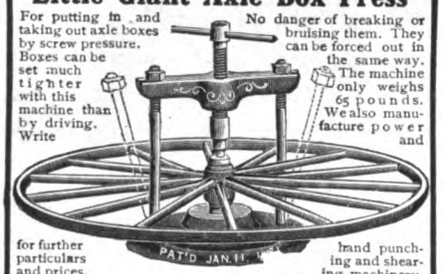
UNITED STATES HORSE SHOES
— ARE SOLD BY —
LEADING JOBBERS EVERYWHERE

United States Horse Shoe Co.
ROLLING MILLS and FACTORY
Erie, Pa.

Vehicle and Automobile
BOWS
S. N. BROWN & CO.,
DAYTON, O.

ECLIPSE
GAS AND GASOLINE ENGINES.
Vertical 2, 3, 4, 5, H. P.
Horizontal 5, 10, 12, 15, 20, 25, H. P.
Designed and Built for BUSINESS.
Catalogue on request. . . . . .
MYRICK MACHINE CO., Olean, N.Y.

NEW ERA
Electric Blower
Direct connected, has been designed especially for the blacksmith and it is his ever ready helper that works for less than five cents per day.
It never tires. It places him on equal footing with the largest steam shops and allows him to work at the anvil steadily while electrically heating his work.
Write for circular and particulars.
NEW ERA ELECTRIC CO.
942 W. Lake St. CHICAGO.

Little Giant Axle Box Press


For putting in and taking out axle boxes by screw pressure. Boxes can be set much tighter with this machine than by driving. Write for further particulars and prices.
No danger of breaking or bruising them. They can be forced out in the same way. The machine only weighs 65 pounds. We also manufacture power and hand punching and shearing machinery.
Heartley Mach., Variety & Iron Tool Wks,
906 Summit St., Toledo, O.

Little Giant.
IT'S A PLEASURE
to work with Little Giant tools with their keen cutting edges. We make screw plates, taps, and dies that excel all other brands in quality, durability and accuracy.
Why don't you write for our Catalogue showing all styles of Little Giant tools? We will gladly send one to you free.
WELLS BROS. CO.
GREENFIELD, MASS.
New York Store, 56 Reade St. London Store 149 Queen Victoria St.
Little Giant.

FOR STRENGTH, SAFETY, AND QUALITY OF MATERIAL
NORTHWESTERN HORSE NAILS
ARE THE BEST ALL AROUND
Perfection in form and finish. Made of the best Swedish iron
Union Horse Nail Co., Chicago, Ill.

HIGH-GRADE BUGGIES
$47.50 AND UP.

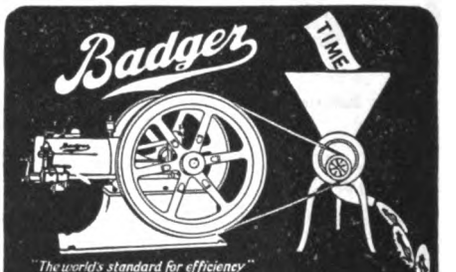
Dealers Only.
Strictly First-Class Material.
JAMES & MEYER BUGGY CO.
Write for Catalog and Prices. Lawrenceburg, Ind.

MARVEL COMBINED SHEAR & PUNCH


Made of Malleable Iron
CUTS ½ in. x 2 in. flat, and ¼ in. to ¾ in. round.
PUNCHES ⅜ in. hole in ⅜ in., and ½ in. hole in ¼ in. stock.
Write for circular and price
Also other Marvel Shears, Punches and Rod Cutters
ARMSTRONG-BLUM MFG. CO.
107 N. Francisco Ave. CHICAGO, U. S. A.

WOOD'S UNIVERSAL **HOLLOW AUGER**


Adjustable to desired length and diameter; made entirely of steel; adjustment easy, simple, and absolutely accurate. A simple turn of the one large right-and-left thumb-screw makes complete adjustment for any tenon from 1-4 in. to 1 1-4 in. diameter, any length up to 4 inches. Practically all dealers sell it: if yours does not, send us the price, $4.50, and we will have one forwarded to you at once by nearest dealer in your section, express prepaid.
Catalogue Free Write today
The A. A. Wood & Sons Co., Sole Manufacturers
50-60 Peters St., Atlanta, Georgia, U. S. A.

Badger TIME

"The world's standard for efficiency"
BADGER GASOLINE ENGINES Turn Time Into Money
Badger Engines enable the blacksmith to make the most money out of his time by enabling him to do more, better and a greater variety of work, and at the same time employ less help—saving cost of helpers.
The "**Badger**" stands for superior excellence and efficiency the world over.
Badger Engines are easy to start and to keep going; cost almost nothing for repairs and last a life-time. They are as cheap as is consistent with best skilled workmanship.
Send at once for our **Fine Book, Illustrated in colors**—It's FREE. It tells all about **Badger** Gasoline Engines, and why they are the best on earth for the Blacksmith. Write today, before the books are gone.
Special discount to Blacksmiths who take an agency.
Write for attractive terms.
C. P. & J. LAUSON,
103 W. Water St., Milwaukee, Wis.

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BUFFALO NO. 660 PORTABLE DOWN DRAFT FORGE

NOTHING TO WEAR OUT **THE FUEL SAVER** **NO SMOKE**

GUARANTEED FOR FIVE YEARS

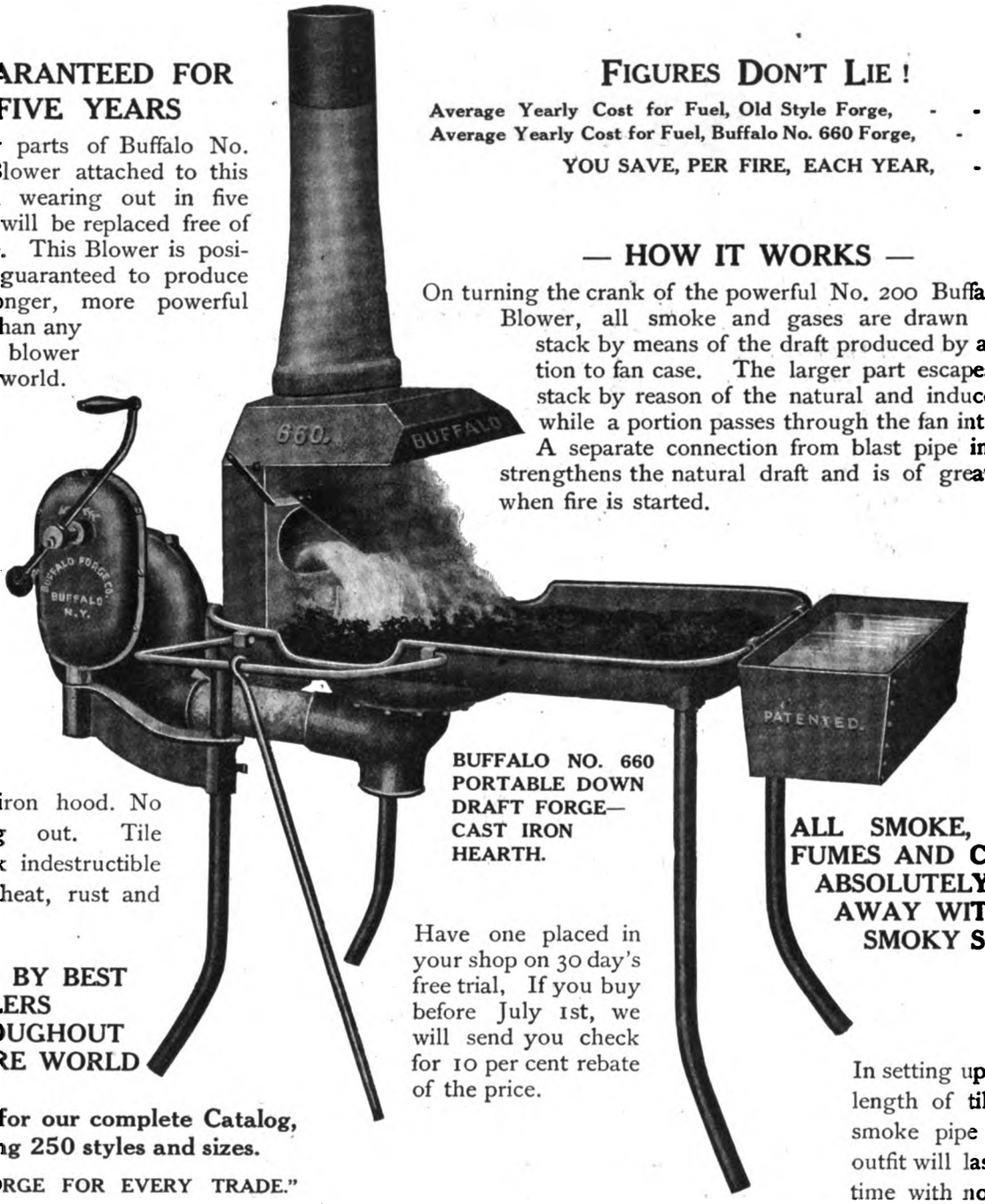
Any parts of Buffalo No. 200 Blower attached to this Forge, wearing out in five years, will be replaced free of charge. This Blower is positively guaranteed to produce a stronger, more powerful blast than any other blower in the world.

FIGURES DON'T LIE!

Average Yearly Cost for Fuel, Old Style Forge, - -	$55.00
Average Yearly Cost for Fuel, Buffalo No. 660 Forge, - -	36.67
YOU SAVE, PER FIRE, EACH YEAR, -	18.33

— HOW IT WORKS —

On turning the crank of the powerful No. 200 Buffalo Hand Blower, all smoke and gases are drawn into the stack by means of the draft produced by a connection to fan case. The larger part escapes up the stack by reason of the natural and induced draft, while a portion passes through the fan into tuyere. A separate connection from blast pipe into stack strengthens the natural draft and is of great service when fire is started.



BUFFALO NO. 660 PORTABLE DOWN DRAFT FORGE—CAST IRON HEARTH.

Cast iron hood. No rusting out. Tile stack indestructible from heat, rust and gases.

SOLD BY BEST DEALERS THROUGHOUT ENTIRE WORLD

Have one placed in your shop on 30 day's free trial, If you buy before July 1st, we will send you check for 10 per cent rebate of the price.

ALL SMOKE, GASES, FUMES AND CINDERS ABSOLUTELY DONE AWAY WITH. NO SMOKY SHOPS.

Send for our complete Catalog, showing 250 styles and sizes.

"A FORGE FOR EVERY TRADE."

In setting up, use one length of tile in the smoke pipe and the outfit will last a lifetime with no repairs.

BUFFALO FORGE COMPANY

BUFFALO, N. Y., U. S. A.

THE CANADIAN BUFFALO FORGE COMPANY, LTD., MONTREAL, CANADA

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SOME POPULAR TOOLS

Royal Blower

"The Successful Blower"



Crank Turns Forward or Backward.

Noiseless and Easy to Operate

Gear case is oil-tight and dust-proof. Gears run in a continuous bath of oil.

Gears are Phosphor Bronze and Steel, flat and straight cut. No Spiral or Worm Gears.

Fire-pot is 8x9½x4 inches inside.

A powerful blast; lasting after blast

Fan, 12 inches. Height, 47 inches. Weight, 135 pounds.

Can be furnished to operate with the right arm, for left-handed smiths, when desired.



Royal (Western Chief) Forge No. 100

For use of Large Blacksmith, Wagon, Plow, Railroad Shops, Etc., where Heavy Work is Done, and a First-class Forge and Fire Are Needed.

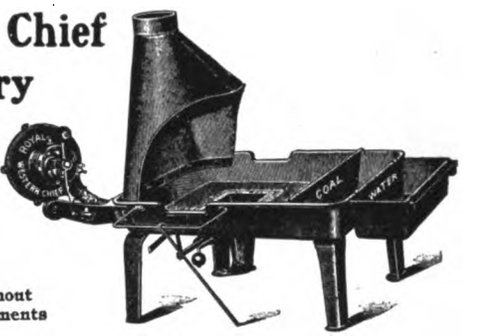
Fan, 12 Inches.
Height, 30 Inches.
Weight, 300 Pounds.
Hearth, 31½ x 43½ Inches.
Length Over All, 53 Inches.

In this Forge we combine our "Royal" style of Blower with Western Chief Standard Hearth, having Solid Fire-pot with Tuyere Ball Furnishing side and center blast. We guarantee it fully.

Western Chief Stationary Forges

Six Different Styles

With or Without Blower Attachments





ROYAL FIRE-POT

Needs No Clay

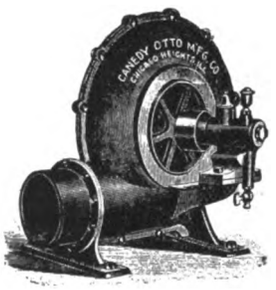
Dimensions 8 x 9½ 4 inches inside

Tuyere Iron

Write for catalogue describing our full line of

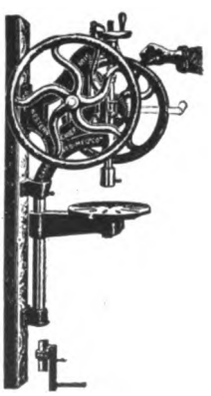
Forges, Blowers and Drills

For sale by first-class dealers all over the world.

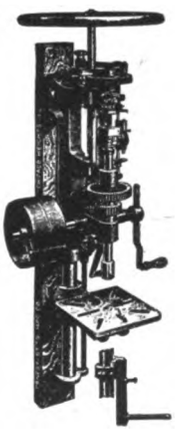


Western Chief Power Blowers

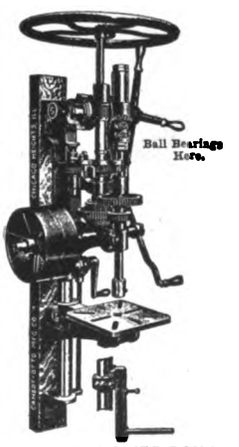
Built in sizes suitable for from one to seven fires



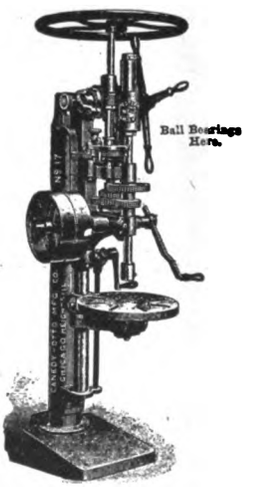
No. 15 WESTERN CHIEF DRILL.
Automatic Self-Feed.
19 in. Circle.



No. 14 WESTERN CHIEF DRILL.
Automatic Self-Feed, and the only AUTOMATIC Quick Return Post Drill Made. 21 in. Circle.



No. 16 WESTERN CHIEF DRILL.
Automatic Self-Feed and Hand Lever Feed. Largest Post Drill Made. 24 in. Circle.



No. 17 WESTERN CHIEF DRILL.
Automatic Self-Feed and Hand Lever Feed. 24 in. Circle.

MADE BY **CANEDY-OTTO MANUFACTURING CO.**

CHICAGO HEIGHTS, ILLINOIS

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THE MILTON MANUFACTURING CO.,

MILTON, PENN'A.

Manufacturers of **REFINED BAR IRON**

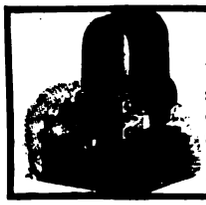
SUITABLE IN QUALITY FOR ALL PURPOSES.

We use Limit Gauges in rolling and guarantee our Bars uniform to size. We will gladly send you samples for test upon request. We are in position to make prompt shipment. We solicit your correspondence.

We also make Cold Punched and Hot Pressed Nuts.

HONEST DEALINGS.

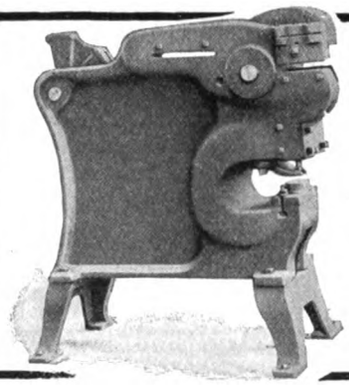
Before an advertisement is accepted for this Journal, inquiry is made concerning the standing of the house signing it. Our readers are our friends and their interests will be protected. As a constant example of our good faith in **American Blacksmith** advertisers, we will make good to subscribers loss sustained from any who prove to be deliberate swindlers. We must be notified within a month of the transaction giving rise to the complaint. This does not mean that we will concern ourselves with the settlement of petty misunderstandings between subscribers and advertisers, nor will we be responsible for losses of honorable bankrupts.



REMY MAGNETOS

Will start and run your Gas or Gasoline Engine without the aid of batteries. Inexpensive and absolutely reliable for either make and break or jump spark ignition. Information sent on request.

Remy Electric Co., Anderson, Ind.



NO. 5 COMBINED PUNCH AND SHEAR.

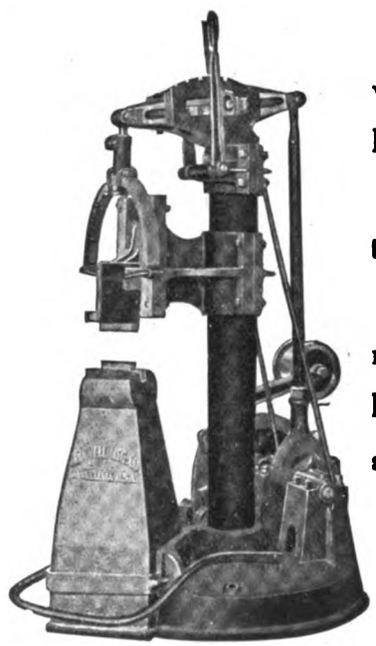
Punches ⅝ in. hole through ⅝ in. iron.
Shears 5 in. x ½ in. flat iron bars.
Shears 1¼ in. round iron bars.
Shears 8 in. x ¼ in. band iron.

Our large descriptive circular will interest you. So will our price.

Badger State Machinery Co.

19-25 Trinity St. Janesville, Wis.

Modern Power Hammer



The ONLY hammer on which you can get a LIGHT BLOW at FULL SPEED.

The shifting lever controls the length of stroke.

Set it in any one of the five notches and then handle the hammer with the treadle the same as any other.

Actually five hammers in one.

Write any jobber or the

THE GRINNELL MFG. CO.,

GRINNELL, IOWA.

Here's The Opportunity

Are You the Man?

If an employer should say to you, "I want a man for an important position," would you be the right man? Opportunities like this are coming constantly to men trained by the INTERNATIONAL CORRESPONDENCE SCHOOLS, an Institution that qualifies men to take advantage of every opening; to command high salaries; to succeed in the best positions.

Employers are daily applying to the Students' Aid Department of the I. C. S. for men to fill positions of responsibility, and during May of this year 447 students **voluntarily** reported advancement in positions and salaries, and this was but a small part of the whole number advanced.

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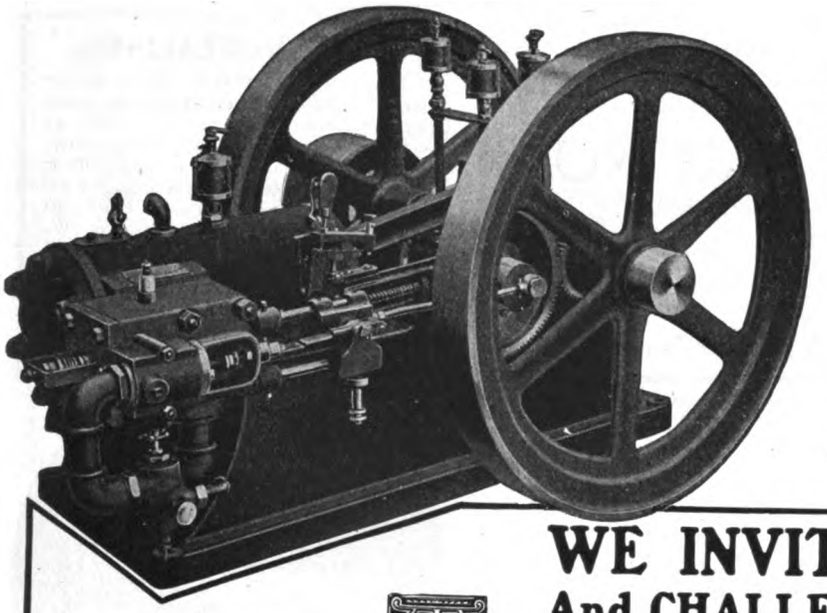
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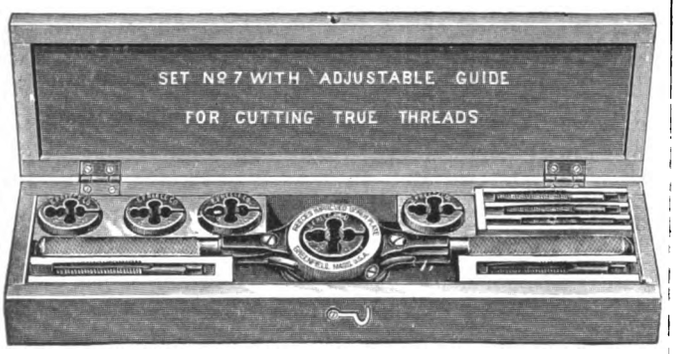
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No. 12 Reece Screw Plate with patent adjustable guide stock and 5 sizes taps and dies, ¼, ⅜, ½, ⅝ and ¾ ins., complete in case, **Special Net Price, $7.87. Or**

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Punch and Shear.

The Most Powerful Lever Punch and Shear Made.

5 Punches and Dies with Each Machine.

MADE IN THREE SIZES.

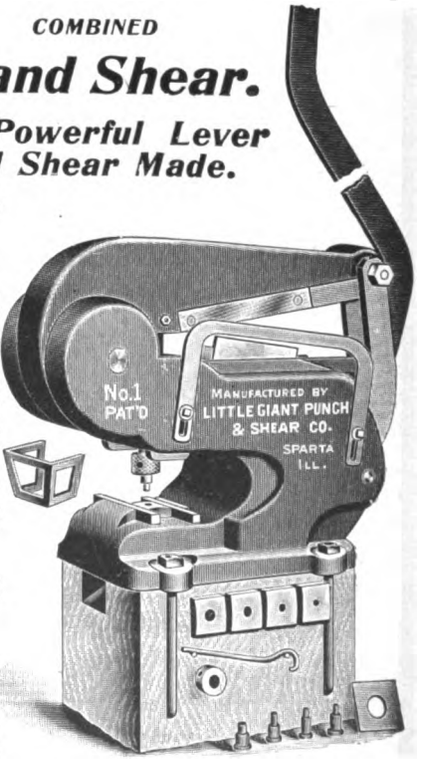
No. 1—Will punch ⅝-inch hole in ½-inch iron. Cuts iron ⅝-inch thick and 1-inch round. Weight, 515 lbs.

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Only ONE operation of the Lever does the work. No changing required.

Note the improved Stripper and Hold-down. This machine is made for the blacksmith shop, and we DO claim that it is decidedly the best on the market for that place.



For Sale by your Jobber. If not, Write Us. Send for Circular.

Little Giant Punch & Shear Co., Sparta, Ill.

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In the Natural State

the hoof of the horse comes in contact with Mother Earth and is perfectly bare. This condition permits free access of natural moisture and fresh air to the frog and other parts of the hoof and the hoof being bare, the frog can expand.

For the horse in service it is necessary to protect the hoof from contact with hard roads, and the closer we can stick to nature and yet give the necessary protection, the better for the horse.

Of all hoof protections the "W & B" Rubber Pad Shoe is undoubtedly the best because, being open, it does not cover the hoof, but permits the natural moisture and fresh air to reach the frog and other parts, keeping the hoof healthy, and as the heavy rubber pads at the heel are resilient, and the shoes do not cause the frog to contract, but rather allows it to expand as nature intended.

The protection is ample, as the frame of the shoe is drop forged from steel, and the channels, both upper and lower, are filled with high grade rubber, thoroughly vulcanized.

The "W & B" Rubber Pad Shoe is fitted cold and applied much quicker than the iron or steel shoe; therefore the shoer increases his profit by using it.

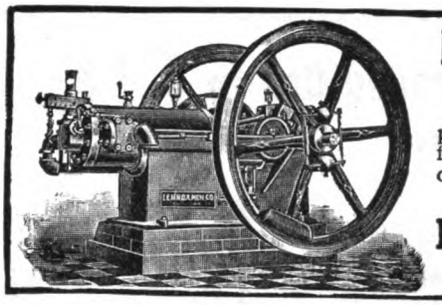
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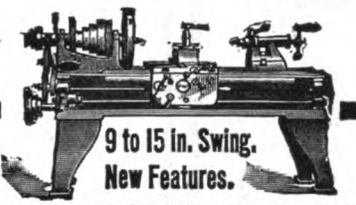
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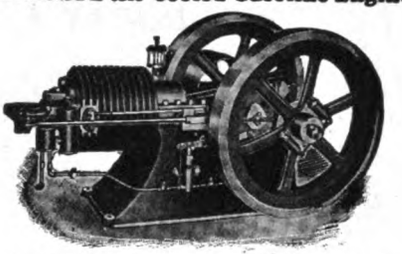
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Our engine lathes are provided with both screw and rod feeds as well as power cross feed. Gears to cut all standard threads from 5 to 36 are furnished. Steady and follower rests, large and small face plates and countershaft go with each Lathe. **Foot Lathes, Tools and Supplies.**

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Made in 2, 3 and 6 horse power sizes. What's the use of paying good money for an old style engine, when you can get something better in the "Gade Air Cooled" at the same cost Buy one. It will not freeze up or go back on you in cold weather. It's ready for business all the time. We know it will please. By all means write for descriptive circulars and price list of the "Gade." Address, **GADE MFG. CO., Iowa Falls, Iowa.**



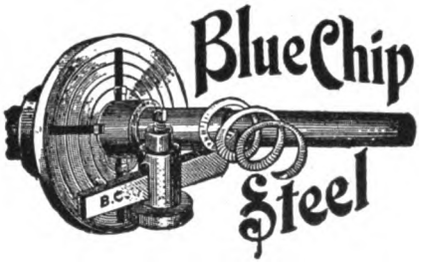
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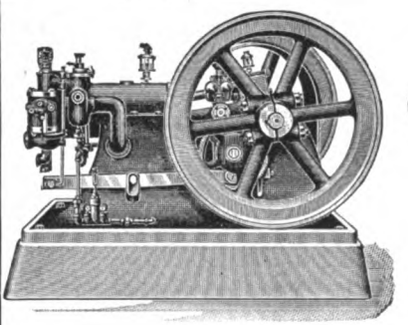
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Manufacturers of

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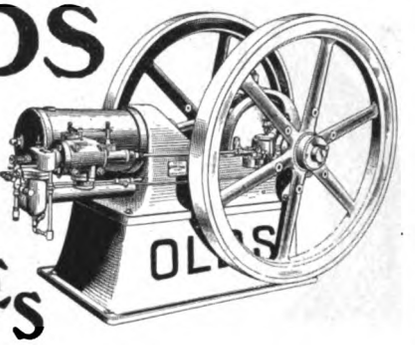
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BORAX-ETTE makes steel weld easily. It does not have to be applied between the laps like other compounds, but is used the same as borax. It has no equal for all kinds of steel welding.

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The gasoline engine best adapted to blacksmith work is the Olds Engine. It is simple—requires very little attention—will not get out of order.

Repairs Practically Cost Nothing.

It gives an economical power, without bother, and can be depended upon any time it is wanted. Our catalog tells why this is so—please send for it and hear our story. We make engines from 2 to 1200 h. p. The one you want at the price you want to pay.

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BUILT OF ARMOR PLATE—NO CAST IRON TO BREAK

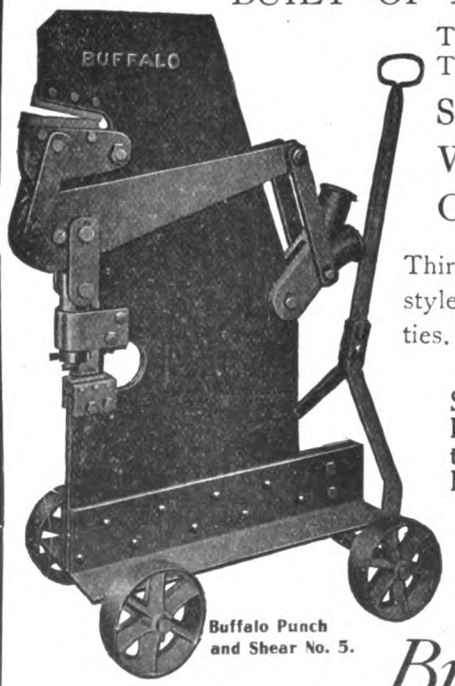
TENSILE STRENGTH OF ARMOR PLATE 175,000 POUNDS, THAT OF CAST IRON 10,000 POUNDS. THINK IT OVER.

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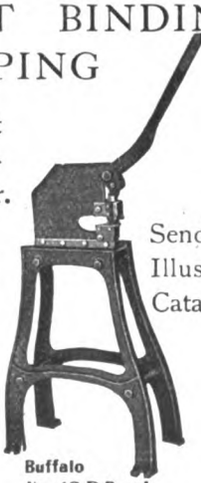
Thirty-five different styles. All capacities. Hand or power.

Sold by Best Dealers throughout Entire World.

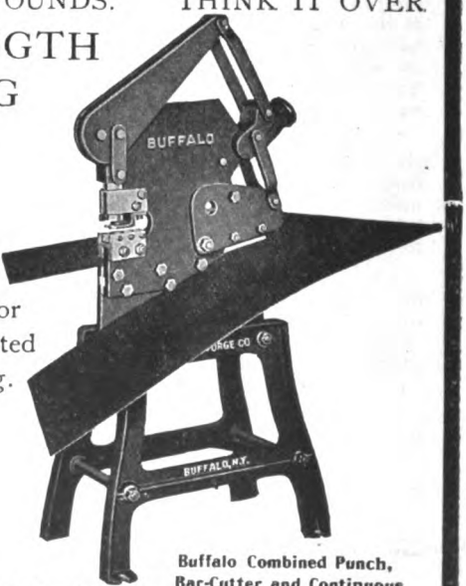
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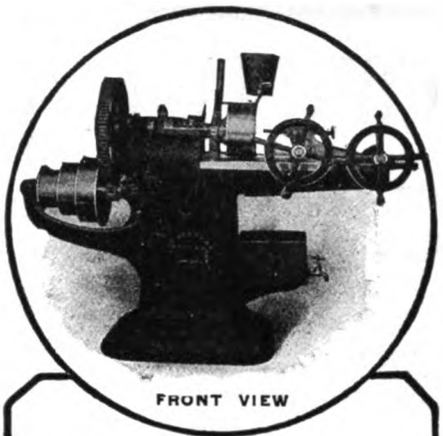
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Buffalo, N.Y.

Canadian Friends, buy of our Montreal factory and save duty.

THE CANADIAN BUFFALO FORGE CO., LTD., Montreal, Canada.

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FRONT VIEW

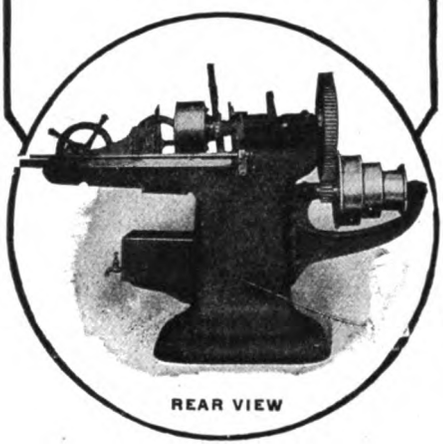
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The Merriman Bolt Cutter Head is Noted for—

1. SIMPLICITY OF THE HEAD: Only Four Parts, consequently,
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5. UNIFORMITY OF THE PRODUCT; Bolts all the same size,
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SEND FOR CATALOG No. 11.

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EAST HAMPTON, CONN.



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Finest Quality Material
Largest Variety of Shapes—Easy to Fit
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Uniformity in Finish

These are only a few of the Special Points that make

PHOENIX
HORSE AND MULE SHOES
EXCEL ALL OTHERS

ALL STYLES AND SIZES



Our line of shoes is the most complete on the market
We carry all styles and sizes and every shoe carefully made

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—ADV. DEPT. AMERICAN BLACKSMITH—



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It's the Best Anvil Made.

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ECCLES BALL-BEARING COUPLINGS

With Leather Bushings in one piece, securely fastened in the socket of the Coupling.

When the shafts are removed, the bushing does not come out, but stays in the Coupling where it belongs. NO LOST BUSHINGS WHEN YOU USE OUR COUPLINGS.

We would like to send you our circular and have you try our Couplings. They will save you money.



Patented June 11, 1907.

The Spring is pivoted at the front so that it can be turned forward out of the way of the wrench while clipping the Coupling to the axle.

These are two of the good points, but there are plenty more desirable features in our Couplings.

Patented Nov. 25, 1902.

We also have a Catalog showing our full line of **Carriage and Wagon Forgings** all of which we make.

RICHARD ECCLES CO., Auburn, N. Y.

The BEST TOOL on Earth for a Horse Shoer

Price, Cash with Order, $1.75 Each

By Express Charges Paid to any point in United States



Patented Jan. 2, 1894.

THE IMPROVED EASY HOOF TRIMMER

DIMENSIONS.—Weight, 2 lbs., Length, 12 ins., Opens 2 ins., Cuts 1 in. **OUR GUARANTEE.**—If you don't like it you can return it and get your money. **Directions for Using.**—First—Hold the foot in the ordinary manner and remove soft parts from bottom with your toe knife; then with the trimmer begin at the heel and cut down and around the toe and back on the other side, removing the part at one cut and in one piece. Second.—Avoid all wrenching or prying. Hold the tool as near upright as you can. Cut straight through to the blank jaw regardless of nails or other obstructions, and with very little leveling with the knife or rasp your job is complete.

THIS TOOL has been rightly named because it is EASY to adjust, EASY to sharpen, and EASY to convince a horse shoer that it will cut a hoof down easier, quicker and better than any tool he ever saw.

It has a detachable knife that can be removed or replaced in a moment. The knife jaw is adjustble by means of screws. When the knife becomes shorter by sharpening, give the screw a turn or so and the reins will go back to the proper distance apart. When knife wears out it can be replaced for a few pence.

CAUTION.—Don't make the mistake that a great many do by grinding bevel on one side of blade, but keep the bevel equal on both sides, so that it will pass through the hoof straight and not in a strain.

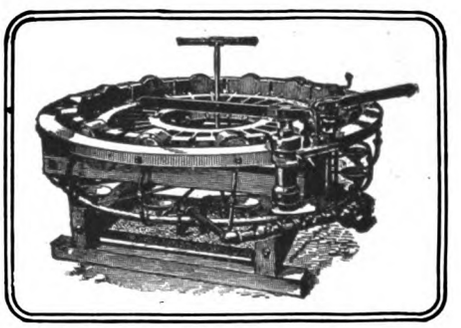
Follow above directions and you will soon learn to use THE BEST HOOF TRIMMER ON EARTH.

MADE BY

MUNCIE WHEEL & JOBBING CO., MUNCIE, IND.

Sole Wholesale Agents for the British Isles, **The Iron and Hardware Co., Ltd., Gloucester, England. C. Kloepfer, Guelph, Canada,** Agent for Dominion of Canada.

The West Hydraulic Tire Setter



Is a **Round Machine** for tiring **Round Wheels,** and compresses the tire at all points—not all in one spot—and the compression is so slight at any particular point that tire bolts do not have to be removed when resetting an old tire, neither are holes closed so bolts are tight in tire. Wheel is made compact and joints tight.

WRITE US YOUR REQUIREMENTS.

The West Tire Setter Company

ROCHESTER, N. Y.

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The Classified Buyers' Guide will be found on pages 40 and 41 of this issue.

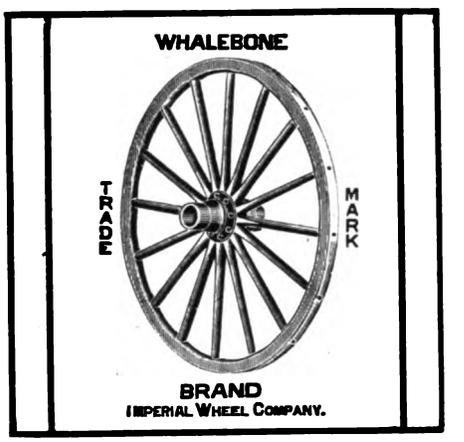


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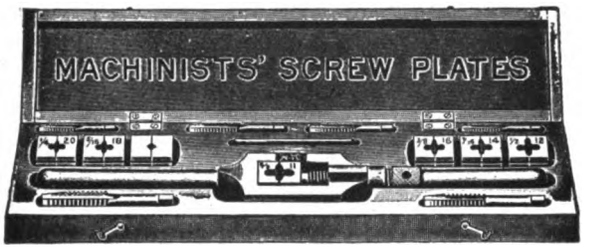
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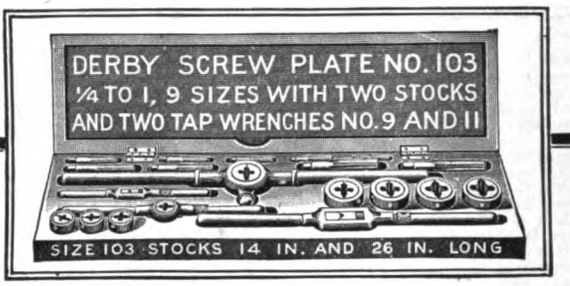
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Do you look up "Prices Current" every month? There's often a chance for saving foretold in that little half-column. Better get the habit of looking up that little line of figures every month. And the wants—they're on the same page. They often contain "tips" for material savings and while you're scrutinizing the price column look down the line of opportunities offered in the column next door. You can take advantage of that column too—if you have a machine to sell—a shop to sell—if you want a man to help—if you want a new shop or a new boss. Just a minute of your time to order your announcement for this column and you'll be put in touch with the best class of smiths in the craft. If in doubt as to what this column can do for you, ask us and you'll know all about it by return mail.

A recent batch of subscription orders from New Zealand brings, among others, that of the gun maker to his excellency the Governor of New Zealand. Orders from other parts of the English-speaking world are from mining, railroad, and construction companies, besides country and city smiths. From Australia, Tasmania, New Zealand, South Africa, and England come orders and words of approval. But don't let our successes so overwhelm us as to allow us to become lax in our work of pushing for "Our Journal." Keeping continually, persistently, and everlastingly at it—thus only is reached the end worth gaining. Thus only can we hope to do the most good in the craft. It's not the spasmodic efforts that count most. It's the continued talking and preaching on THE AMERICAN BLACKSMITH—what it has done for you, what it is doing, what it is going to do—that counts most in the long run. It's asking the neighbor to subscribe until you get his order. If you want our assistance in getting orders, let our subscription department know about it. Our little pamphlet "The Book of the Blacksmith" contains unsolicited testimony from every State in the Union—it'll interest the man you're trying to get as a subscriber. Ask for a few of these and hand them to prospective subscribers when talking about "Our Journal."

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If you had a chance to locate in the southwest, would you go? There is a pretty good opportunity offered by one of our readers in the "Queries, Answers, Notes" department, and if you're looking for a better location better ask about this opportunity. And, by the way, don't forget, Mr. Reader, to let us know of any opportunities you may come across. We want to help our readers as much as possible and want the coöperation of every one of our big family. Coöperation is the only means by which we can be of the greatest help to the craft, and we call upon readers to come forward with their help. When you hear of a good locality without a good smith, tell us about it. We will do as much for you, and more, if you give us the chance.

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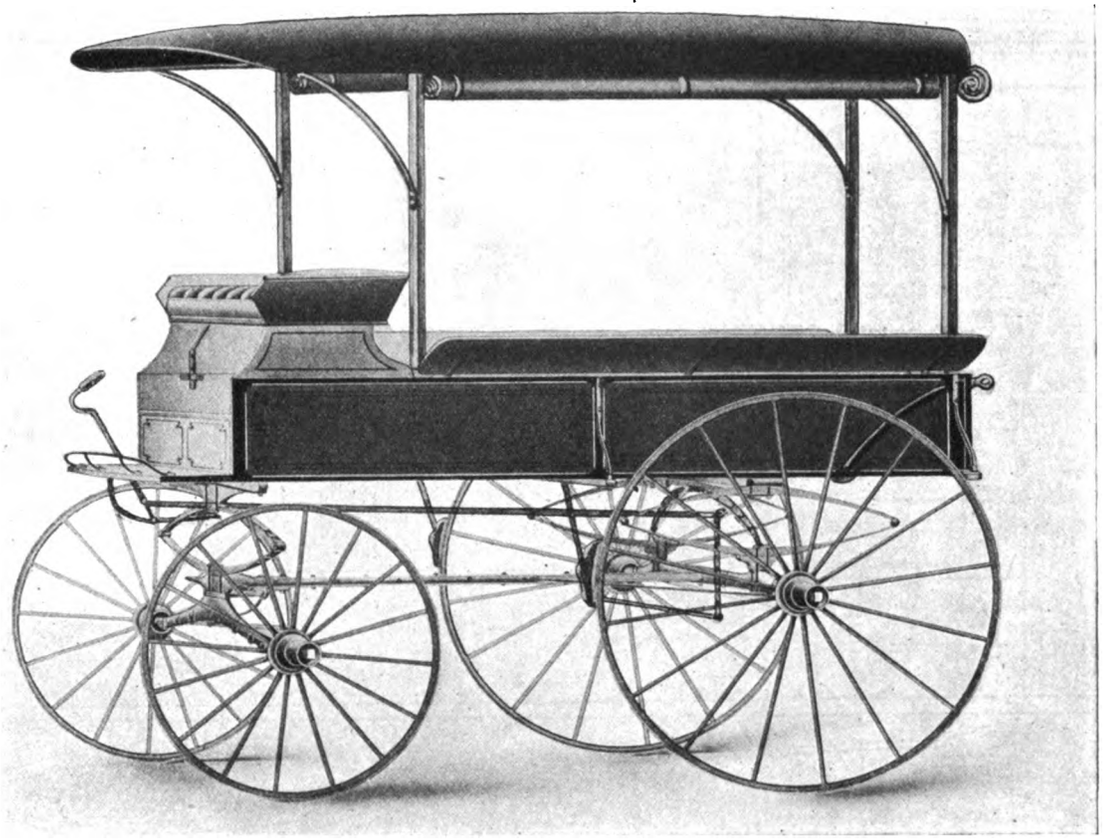
By reason of the advanced postage rate on all second-class mail matter for delivery in Canada, the yearly subscription price of THE AMERICAN BLACKSMITH, to Canada, has been advanced to $1.50. We would therefore have our Canadian readers bear in mind the advanced rate when sending in their renewal subscriptions. Of course, all present subscription obligations will be filled, regardless of the very material postage advance, or the time the subscription order was received.

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THE WOOD CRAFTSMAN, WITH THE AID OF HIS BROTHER WORKER IN METAL, ENABLES THE WORLD TO TRAVEL ON WHEELS

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A ONE-HORSE WAGON FOR THE QUICK DELIVERY OF SMALL LOADS

Plans for Building a One-Horse Delivery Wagon

NELS PETERSON



SMALL LOADS and quick delivery is the combination aimed at with this vehicle. For the grocer, butcher, or other retail merchant this one-horse delivery wagon is ideal. As indicated, the running gear is a single-reach, three-spring make, with wood hounds for bracing the rear axle. They are secured with strap bolts through the rear axle. Another brace made of $\frac{5}{8}$-inch round iron is fastened to the axle clip, directly under the rear spring and extends forward to A, Fig. 4, on the reach. The front wheel strikes here turning, and the brace is welded to the rub iron and bolted to the hound as shown. This method of bracing the rear axle makes it very rigid, and is necessary on account of the strain brought on this axle when the brake is applied. The center-reach is 5 feet 10 inches long between axles, 2 feet by $1\frac{1}{2}$ inches at the head-block, tapering slightly towards the back end, where it measures $1\frac{1}{2}$ inches by $1\frac{1}{2}$ inches. Here it is mortised into the rear axle cap. It is securely fastened by means of a heel strap extending a distance of 12 inches on top of the reach and bent over the axle cap and passing through the reach plate, which serves as a clip yoke, as shown at A, Fig. 3. The front end of the reach is secured to the headblock by means of a strap bolt on each side, which passes through the headblock and extends backward. It is bolted to the side of the hound, with the reach plate, $1\frac{1}{2}$ inches by $\frac{3}{4}$ inch, running full length under the reach. A T-weld to the front end fits the headblock. It can be seen that this gear will withstand considerable strain.

The rear axle is $1\frac{1}{2}$-inch, with an 8-inch spindle, and is perfectly straight. The front axle is $1\frac{1}{4}$ inches, with an 8-inch spindle, and is arched sufficiently to bring the reach up in front till it is level with the back end. This is necessary on account of the difference in the height of the wheels, the front wheel being 36 inches and the hind wheel 48 inches high, with $1\frac{3}{4}$-inch rim. The front spring for this job is 36 inches long, with 7 leaves 2 inches wide. The two back springs are somewhat lighter, being $1\frac{3}{4}$ inches, with 5 leaves 36 inches long, and a helper spring $1\frac{3}{4}$ inches, 4 leaves. The fifth wheel, or D-plate, so called on account of its shape, is 14 inches across.

The brake attachments are similar to those shown in other vehicles, the only material difference being in the brake beam, which is bent so as to have it pass under the reach, which is shown in the rear end view at B. On a platform gear this would not be necessary; the beam is always left straight, as there is nothing to obstruct it.

The body for this job is made 4 feet wide out to out. The sills are 9 feet 8 inches long, measuring from the front end of the footboard to the rear end of the back crossbar, and are made $4\frac{1}{4}$ inches by $1\frac{1}{4}$ inches in size. The body proper measures over the panels 8 feet 6 inches long and 11 feet deep from the sills to the flare boards.

A careful examination of the bottom plan of the body will show that there

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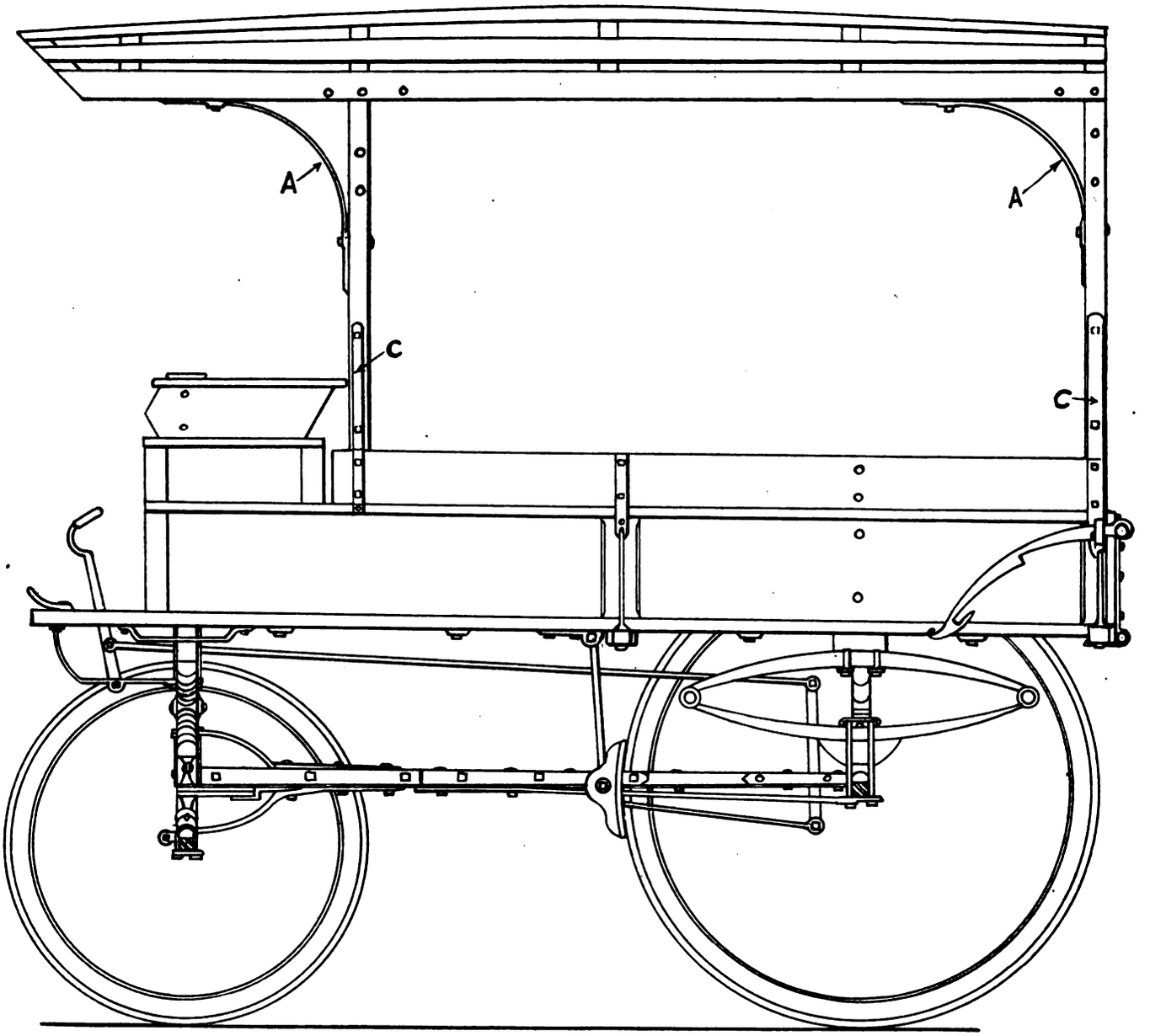


FIG. 1—A SIDE ELEVATION OF THE ONE-HORSE WAGON, SHOWING GENERAL LINES OF TOP AND GEAR

is very little chance for it to give in any place. The bottom boards, which are $\frac{7}{8}$ inch thick, with the ends resting in grooves cut into the rear crossbar and front cross sill, are further supported by a cross bar in the center, the front and rear spring bars and four cleats, as shown, making the bottom very solid.

The top, which is put on with four posts resting directly over the edges of the flare board, extends upward $37\frac{3}{4}$ inches from the flare board to the first rail on the top. It continues bow-shaped the entire distance across the top. A notch is cut in the rail as shown at F, Fig. 3, and a filler put in from the flare board to the rail as shown at E. Heavy strap bolts are then run from the sill on the inside of the panels for some distance up the posts. The body brace on the outside is also made to extend up on the post and there bolted together firmly. This is shown at C, Figs. 1, 2 and 3. Heavy T-irons are put on at the top of the posts with four $\frac{1}{2}$-inch round braces as shown at A, Fig. 1. This completes the ironing of the top, which is then covered with canvas drawn tight and finished off with side curtains as usual.

More About Welding Tires.

H. CHISHOLM.
North Dakota Agricultural College.

The smith who asked for information about welding wide tires must be very hard to suit if he is not satisfied with the number and variety of answers to his inquiry in recent numbers of THE AMERICAN BLACKSMITH. I hope he will pardon me if I offer still another suggestion.

I have been interested in the different methods described and recommended, a number of them containing very good suggestions, and the most I have to say will be in the nature of endorsing the recommendation of others. It ought to go without saying that the largest item in all welding is in handling the fire so as to get the proper heat. This is the most vital point.

I notice that several correspondents advise the use of sand, borax, welding plates, etc. This, I think, is not good practice, especially on iron tires. Iron needs no flux for welding, as it contains all the material for a perfect flux. Sand is an injury to iron, and, while borax is not, yet it takes time and is a small item of expense. With iron (and with most grades of mild steel), the most perfect conditions for a welding heat are obtained by having a fire so arranged that only a hot blast can come in contact with the iron.

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Unfortunately, this is difficult to do in an open forge. The nearest approach to this I have found in the plan recommended by "W. D. N." in the May number; viz., a piece of fire brick laid over the tire, and projecting over the edges, and the whole covered with clean coke. I have practiced this for many years, when welding wide, thin iron which could not be handled in a hollow fire. The forge described by J. C. Lamon, also in the May number, is the proper thing for very wide work.

I think much of the difficulty which many smiths have in welding wide and heavy tires is because the fire in the bottom of the firepot gives out before the proper heat is obtained, and it is difficult to replenish it with the tire in the fire. See that there is a sufficient body of solid coke in the bottom of the fire before putting the tire in for the weld.

The frame described by Mr. E. D. Pendleton is a great help, but is something of a bother with some kinds of work.

In my own practice, I never punch holes in tires or fasten them together in any way. Just scarf, and lap in the ordinary way, and when hot the ends will keep in place.

I was taught to use sand in welding, but in 20 years I have not used it 20 times, and for the past ten years have not had it in the shop.

How to Set a Wheel Box.

J. W. DARON.

The reason I select this subject is because it is very little discussed compared with that of axle setting, to which it is closely allied, and also because it comprises some points which ought to be known by every young wheelright and blacksmith.

I bore the hole in the hub the proper size for each end of the box, with the Little Giant hub borer, which gauges from the rim, and makes any degree of tapered hole desired. I always make the hole in the center some larger than the box. If this is not done, a box soon becomes loose and is apt to break on account of the side motion and jerking of the wheel. And when a box gets in this condition, it does not take long for the grease to find its way to the tenons of the spokes, which become loose and ruin the wheel. The essential point in box setting is, therefore, the fastening of the box at the ends, and leaving ample space around it in the center.

If a wheel's hub has become so ground out inside and so irregular that the box cannot be set and fastened securely, I simply enlarge the hole a little until it is regular with a little taper. Then I fit a plug to fill it, and then drive it in tightly with white lead. I then make a new hole for the box as in a new hub.

The Use of Alcohol and Gasoline in Gas Engines.—3.

C. E. JUCKL and A. M. WOODWARD.

Adaptability of Various Types of Engines.

The cost for fuel to maintain a brake horsepower for one hour varies widely and the dearest costs is nearly 48 times as much as the cheapest. The fact that not everybody uses the fuel giving the cheapest power in point of fuel cost, but that even the most expensive finds a ready market, makes it clear that there must be good reasons. These reasons may be found in local variations in price of fuel, in differences in adaptability of the engines to the work required, and in the fact that the figures show fuel cost only, whereas there are great differences in the cost of attendance. An elaborate steam plant, to be even fairly efficient, must be continuously operated at a fairly heavy load; intermittent working or working at a decreased output makes them wasteful of fuel. Moreover, the apparatus is so complicated, slow to start up, and dangerous to life and property in careless or inexperienced hands that persons must become skilled by years of study and practice before they may be allowed the handling.

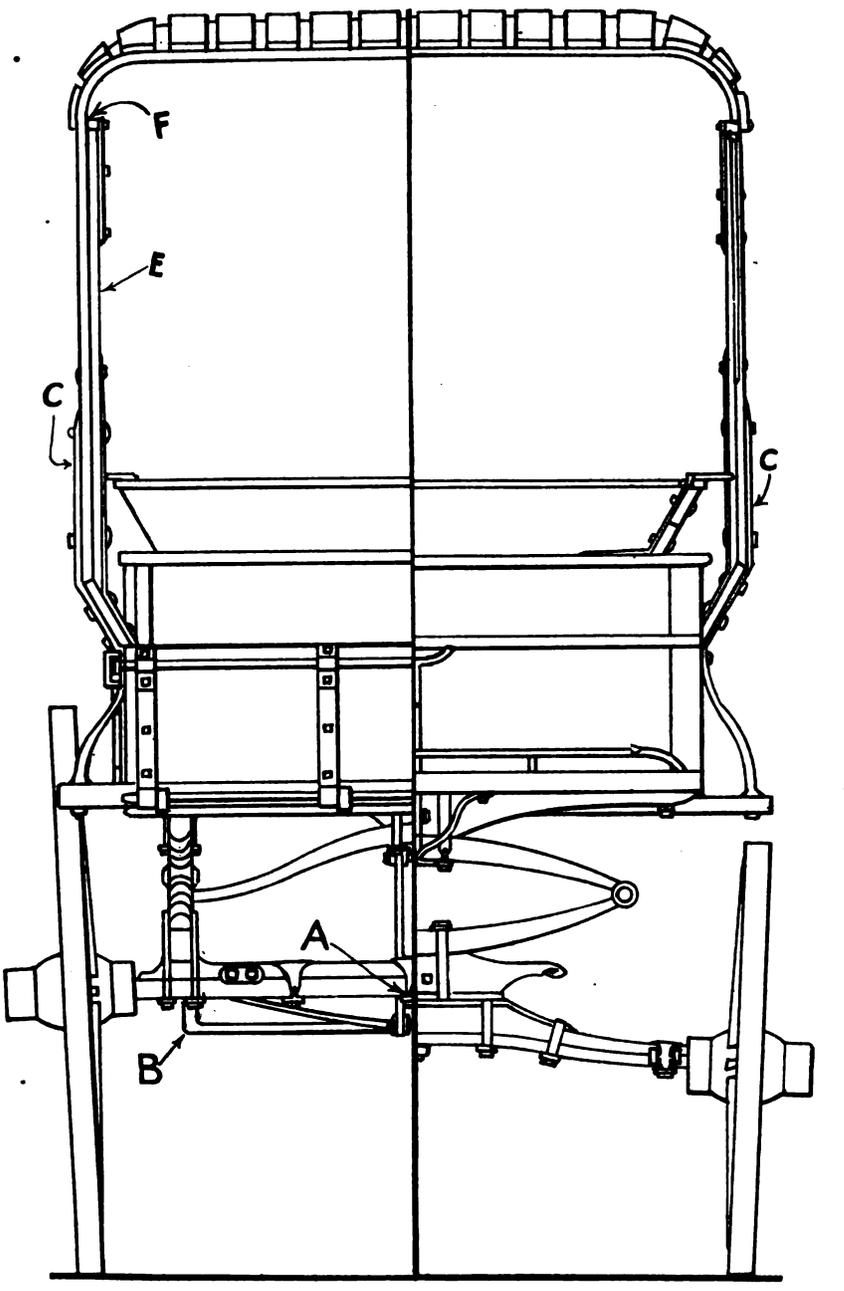


FIG. 3—SHOWS A HALF REAR ELEVATION OF THE LIGHT DELIVERY WAGON

FIG. 2—SHOWS A HALF FRONT ELEVATION OF THE LIGHT DELIVERY WAGON

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The gas engine with its producer can handle today the same kind of coal that is used in steam plants, and yet the weight of this apparatus and its lack of flexibility, compared with steam engines, make it unavailable for steamships and locomotives; so it is clear again that adaptability to service is even more important than the cost of fuel. Similarly, gas-producer plants have not yet been successful for sizes smaller than 25 horsepower, and especially unsuccessful have they been so far for intermittent work. For the small sizes the steam plant is also very wasteful of fuel, requires a skilled operator, and is slow in starting; so it is clear why engines burning crude oil, gasoline, kerosene, and other liquid fuels explosively should be used for light work in isolated situations where the work is intermittent and where quick starting and small care in attendance are essential. In this connection it must not be forgotten that a kerosene, gasoline, or crude-oil engine can be started in a few minutes and can even be left running for practically a whole day with only an occasional examination to see that the oil cups are flowing properly and the bearings are not getting hot through being dirty. Steam engines with their boilers, on the contrary, cannot be started inside of one or two hours, and all the fuel necessary to raise steam is wasted so far as the work to be done is concerned. Moreover, a steam engine requires continuous feeding of coal and close attention, so that a man must be always near it, having no other duties but its care.

In the natural-gas regions a large number of gas engines are working, and in the oil regions a similar number of oil engines and gasoline engines, because the nearness to the supply makes the fuel cheaper than transported fuel, and the exploding engine is more efficient than the steam engine.

Not only is the gas engine field a real one, but it is a large one, as is shown by the number of these small engines being sold today. The exact figures on the sales are not available and it is impossible to secure them because of the unwillingness of manufacturers to tell their business; but when a single manufacturer (as is the case) is selling 425 per day, and there are in the United States alone some 300 manufacturers of importance, there can be no doubt as to the popularity of these machines.

Alcohol at a price unknown now becomes available for use in engines, whose peculiarities are not fully known and whose ability to transform heat into work is correspondingly in question. If the alcohol engine can be shown to have an efficiency as high or higher than other liquid-fuel engines and be similar in type and characteristics, it can do all that they can do, and its field will be the same as their field in spite of fuel costs; but by field is meant the nature of the work rather than the geographical location. It is likely that the alcohol engine will find as favorable a geographical location as the natural gas engine and the oil engine have, near the source

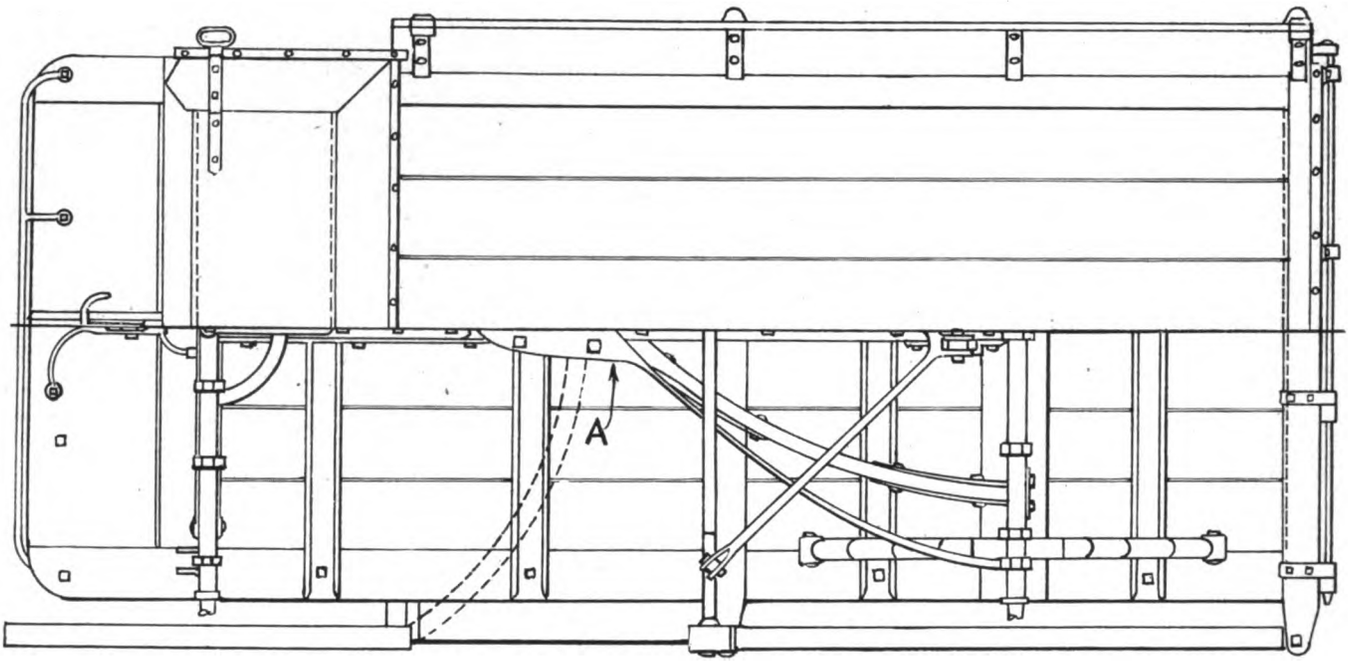
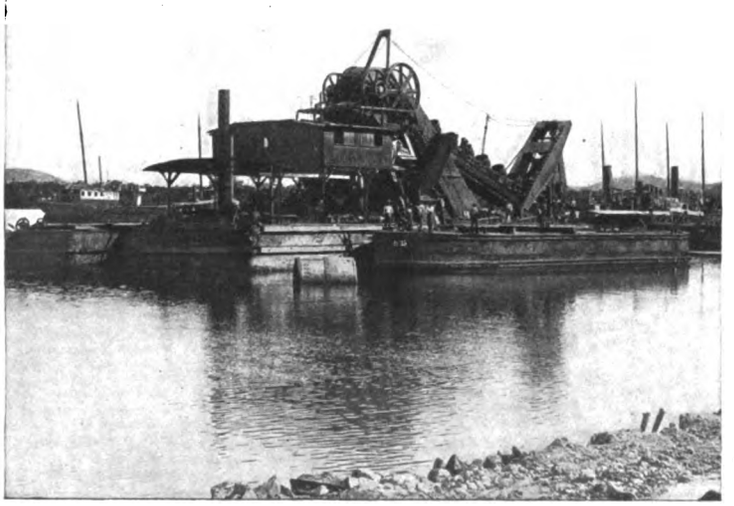


FIG. 4—SHOWING A HALF TOP AND ALSO A HALF BOTTOM PLAN VIEW OF THE ONE-HORSE WAGON



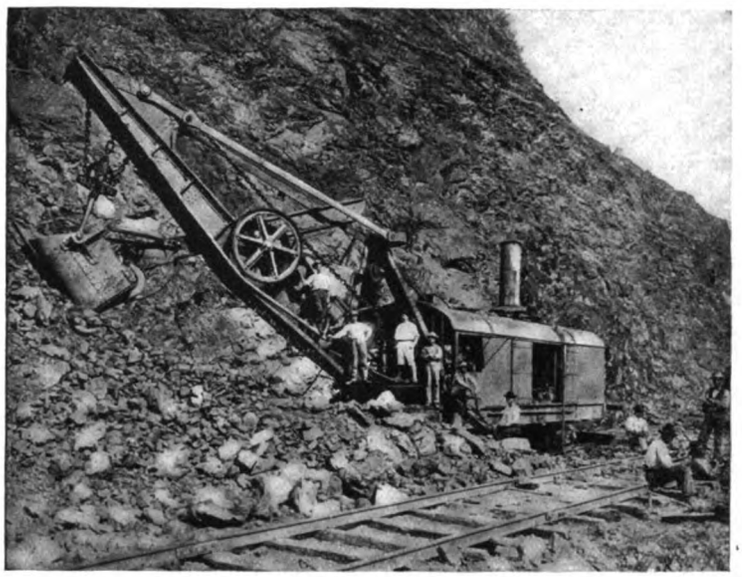
ONE OF THE GIGANTIC DREDGES AT WORK AT THE TERMINUS OF THE PANAMA CANAL

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of supply and far from the source of competing supply. But should it appear that the alcohol engine can do more or better work than its oil or gasoline competitors, its field will be wider. In any case the position which the alcohol engine may take today is no criterion as to its future, because it will operate on a source of energy or fuel supply which, as pointed out, is inexhaustible, whereas the supply of both crude oil and its distillates may ultimately become exhausted.

The determination, then, of the position of the alcohol engine today involves a forecast of the future, and should it be shown to be able to compete now, it must inevitably reach a stronger and more important industrial position as time goes on. This is the fact that has led governments to take up the question, and among them the United States is the latest.

The Office of Experiment Stations of the Agricultural Department, in connection with its Irrigation and Drainage Investigations, has tested a number of different types of gasoline engines with alcohol and obtained figures which show the comparative consumption of gasoline and alcohol in the same engine. The detailed results of these tests will be published in a technical bulletin, but the general results may be given here. The first tests were made without any particular attempt at obtaining the best adjustment of the engine for each fuel, and showed a consumption of alcohol two to three times as great by weight per horsepower hour as was necessary with gasoline or kerosene. These figures indicate the necessity or desirability of determining the proper conditions of adjustment, because these were found to have a serious influence on the amount of fuel consumed. With care in adjusting the engine so as to secure the most economical use of the alcohol, it was found that, under like conditions, a small engine consumed 1.23 pounds of alcohol to 0.69 pound of gasoline per brake horsepower hour—that is to say, with the best adjustment of the engine for each fuel there was required 1.8 times as much alcohol by weight as gasoline per brake horsepower hour.



A STEAM SHOVEL ON THE CANAL STRIP AT PANAMA EXCAVATING ROCK

It was also shown in making this adjustment that it was possible to burn more than twice as much alcohol as stated, by improper adjustments, and still have the engine working in an apparently satisfactory way. The range of excess gasoline which might be burned without interfering seriously with the working of the engine was not so great, being a little less than twice as much as the minimum. These early experiments, therefore, confirmed the early results secured in Germany, to wit: that an engine built for gasoline or kerosene will, when unchanged, require about twice as much alcohol by weight for the same work; but they also indicate something that is not pointed out by the reports sent us from abroad—that is, the great importance of securing the best adjustment of the machine.

To understand why this adjustment of the machine can have such a serious effect and at the same time understand why exploitation and study were successful abroad in raising the efficiency of the alcohol engine from 12:2 to over 30 per cent in five or six years requires a knowledge of technology. The reasons can only become clear to one understanding the mechanism of these engines and to one familiar with the chemistry of the fuels and the physical theories of explosive combustion.

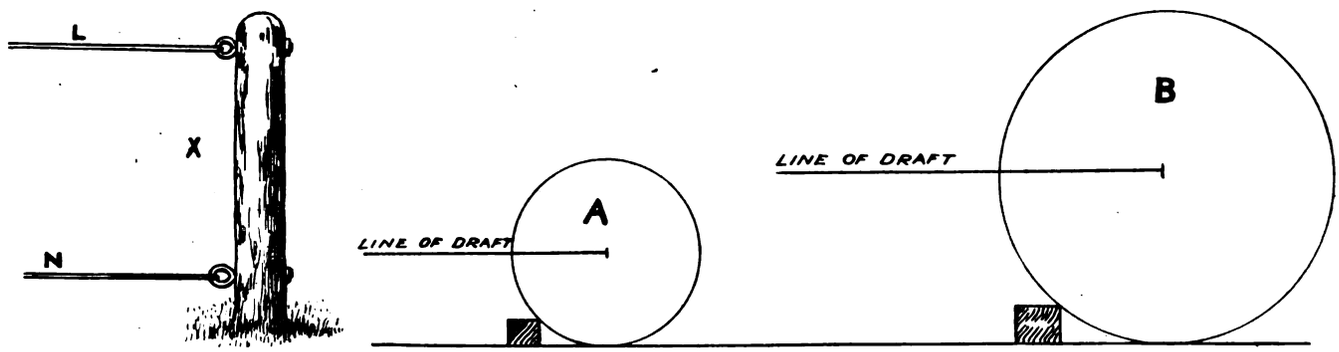
(*To be continued.*)

That High and Low Wagon Discussion.

L. VAN DORIN.

Pardon me for criticising Mr. P. M. Wade's article on page 166 of the April issue. His reasons, according to my estimation, are entirely wrong.

I understand him to mean that the higher the wheel, the greater the portion of it that passes the obstacle when struck by the wheel and the weight in that portion helps to pull it over



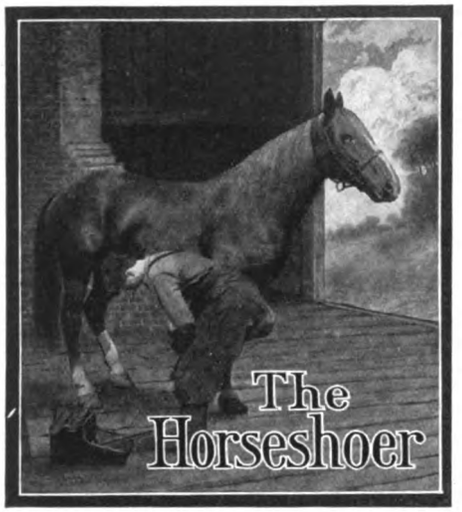
THE PULLING OF A WAGON IS LIKENED TO THE PULLING OF A POST

Now, if that argument were good, the weight in the rear or hind part of the wheel would counterbalance the front portion, and nothing would be gained.

The accompaning engraving will clear-

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ly show that it is all a question of leverage. For instance, if you desired to pull down a post set in the ground as at X, would you hitch on at the point L or N? At L, of course. The same principle is involved in both cases. Notice the line of draft in A, how much closer it is to the obstacle in front of the wheel than in the example at B, thus giving the advantage in leverage to the high wheel just the same as pulling the post at L instead of at N.



To Cure Thrush I use aqua fortis (nitric acid) with very good results. I paint the part affected sparingly with the liquid two or three times a week, using a feather to put on the application, as it is a strong poison and must be used carefully. Recently I cured two cases where the horny frog had quite rotted away, leaving the sensitive part bare, and now they are perfectly sound. I have also used butter of antimony and calomel, but have cured with aqua fortis where I failed with the other two. R. BARNES, England.

Thrush is a diseased condition of the membrane covering the frog, and is caused by filth and neglect. In most cases, it is easier prevented than cured. If the horse had been taken care for properly, he should not have this disease, for it is caused principally by an accumulation of dirt which is allowed to remain from day to day, and which is left for the blacksmith to remove. In order to cure this disease, the cause must first be destroyed. Place the horse in a stall that has a clear, dry floor, and place his feet into a bath of warm water, and thoroughly clean them. Add a zinc chloride solution of three grains to an ounce of water. With this local treatment use an internal one, if necessary. A combination of the two will give good results.
D. FOSTER HALL, Massachusetts.

Interfering.

Its Causes and Cure.

E. W. PERRIN.

A traveling salesman recently called my attention to the contradictory theories advanced in THE AMERICAN BLACKSMITH by some of your correspondents with reference to the above subject. When men disagree upon a point all may be in error; and, since they disagree, it is certain that all cannot be right. So in horseshoeing, when men advance contradictory remedies for the cure of one and the same defect, each advocate claiming success and infallibility for his particular remedy, who shall reconcile them? For instance, here is a gentleman who says that he has been shoeing horses for 63 years, and has not yet seen the horse that he could not stop interfering. In the May issue he says:

> In shoeing interfering horses I notice that most writers say to cut down the outside of the foot the lowest, and raise the inside, if they have to use leather. For myself I don't believe in this method. Having a little experience in the business for 63 years, and still shoeing every day at the age of 78, I think I know how to shoe most anything that wears shoes. I have a standing offer that if I can't break a horse or mule of interfering in shoeing him twice, I make no charge for shoeing. I have not found one yet that I didn't cure. My plan is first to stand in front of the animal, and see how he stands on his feet. Then dress the foot one-fourth to three-eighths of an inch lower on the inside than the outside, and set the shoe natural. Use a plain, common shoe, and I know from experience that it stops interfering. G. W. BIGELOW.

Mr. Bigelow seems to have lost sight of the fact that, if lowering the inside of the hoof is the proper remedy for interfering, it is entirely unnecessary "to stand in front of the horse to see how he stands on his feet." It is as if a builder had said, "I never have any trouble trueing up columns. My plan is to stand in front of the column to see how it stands, then knock it a little to the left at the bottom, and it's true; I have never known it to fail."

Again, there are other writers who would prevent interfering by adjusting all feet to the measurements of a "hoof-leveler." I have read of so many shoers who "never saw the horse that they couldn't stop interfering," and yet the harness makers are selling just as many anti-interfering boots as ever. In view of such contradictory theories, it would appear that some of the writers have too little regard for the truth, or that their practice is so limited that, having obtained success in a few cases, they think the same remedy will prove successful in all. Such writers remind me of the vendors of a patent medicine having genuine merit for coughs and colds, while they persist in advertising it to cure measles, chills and fever, rheumatism, sore eyes, and tender feet. And so some horseshoers are not content to say that lowering the inside of the hoof will cure interfering in *some* cases, but they insist it will cure *all* cases. The only intelligent way to eradicate any defect, interfering or anything else, is to try to ascertain the causes.

The causes of interfering are various, but most potent of all is defective conformation of the limbs (see Figs. 1, 2, 3, and 4). Pain in the foot or leg from whatever cause may cause interfering. Overwork and debility are also causes. Only the first cause need concern us here, for when interfering results from debility, overwork, or pain in the foot, the proper remedy is to remove the cause as far as possible. If the cause be irremovable (as it is in some cases) then protect the injured part with a properly fitting boot.

Now, as to defective conformation: let me say that the conformation of the horse's body and limbs is a study in itself, not easily mastered. In fact, only a horseman with horse sense, a knowledge of mechanics, and a keen eye to proportion can understand it. To be sure, every horse has a body and four legs, but no two horses are exactly alike Each animal has some peculiarity of its own. The multitudinous varieties of conformation of body and limb, of muscular development and mode of action, makes each animal a



FIG. 2—SHOWING COW-HOCKED CONDITION OF HIND LIMBS



FIG. 1—SHOWING THE HIND LEGS TOO CLOSE TOGETHER

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little different. Cavalrymen will say of their mounts that some are good to ride, some fair, some bad, and some so rough that to ride them without stirrups would make you see stars.



FIG. 3—SHOWING BASE-WIDE CONDITION OF FRONT LIMBS, WITH TWISTED AND CALF-KNEED RIGHT LEG

Now let me call your attention to the illustrations, Figs. 1 and 2. These are from life. Fig. 1 shows the legs too close together, while Fig. 2 shows the points of the hocks too close with the feet wide apart (cow-hocked). Both these conformations are prone to interfere. Figs. 3 and 4 are illustrations of front legs. Fig. 3 is that of a fast pacer belonging to a local liveryman, while Fig. 4 is that of a horse of the City Fire Department. In order to assist the eye to a correct understanding of these illustrations, perpendicular lines have been drawn. Now observe the lines A, B, C, Fig. 4. You see that while the top of the line A falls from about ¼ of an inch outside of the right arm, the bottom strikes the outside toe of the hoof. Now observe the line C, falling from about the same distance outside of the left arm. The bottom is about ⅞ of an inch outside of the hoof. Again, while the right leg, though "calf-kneed," stands square to the chest, the left leg is twisted from the arm to the foot, and is toe-wide also. This animal used to strike the left fetlock with the right hoof and the right knee with the left hoof. This case was cured by leaving the right hoof high on the outside and the left hoof high on the inside, and the use of special shoes as you see him now shod in the picture. Now take a glance at Fig. 3. Here both legs are base-wide and toe-wide, but the right leg is not only set on at a considerable angle to the body, but it is "calf-kneed" also.

When an inexperienced person looks at the feet and legs of a dozen horses all standing in a row, he does not discern any difference one from another, but the camera will reveal the fact that no two sets of legs are exactly alike. A volume of 200 pages could not contain sufficient pictures to illustrate all the peculiarities in the conformation of body and limb. Some are base-wide; some are wide at the haunches, yet with feet close together; some toe out; some toe in; some front legs are set on square to the chest, others at an angle; some with one leg square to the chest with its fellow at an angle. Some horses have long, oblique pasterns with low heels; some short, upright pasterns and high heels. Some horses have sore tendons (not necessarily enough to cause lameness), and when you cut the heels of their hoofs too low you will probably make them interfere. Some horses have corns and in their endeavor to save the inside heels from concussion they hit the opposite fetlock. Some horses that interfere all round are cured by leaving the outside of the front feet high and the insides on the hind one high, while another is cured by the very opposite process, simply because their legs are not of the same conformation. Some horses that interfere are cured simply by rolling the outside quarter of one foot. The fact is that when you dress the plantar surface of the hoof so as to conform to the set of the limb above it, the animal generally goes clear.

That lowering the inside of the hoof does cure *some horses* is admitted, as lowering the outside will surely suit some others. But to say that there is any set rule for dressing *all feet*, or any system of shoeing that will prevent interfering in *all horses* is an insult to common sense. Each case must be studied separately in an effort to ascertain the cause. And the remedy must mitigate or remove the cause if you are to have success. To look at a set of limbs and determine from their set and movement how they should be dressed and shod, is a branch of the horseshoer's art which is truly scientific and cannot be mastered without careful study combined with much practical experience. It is the same with shoeing as with all things; a study of the case in hand must first be made. In short, "Be sure you are right, then go ahead."

A Cure for Seedy Toe.

A. G. PANTON.

In reading over Mr. E. W. Perrin's letter on shoeing for seedy toe, I find that he thinks that the disease begins at the bottom of the hoof and works its way up to the coronet. I think, however, that it always commences at the top and works downward with the growth of the hoof, and I find more cases in mules than in horses.

Right now I have a case under treatment. The mule was very lame, but there was no sign of seedy fissure at the toe, but I knew that the foot was hollow higher up by the bulging appearance of the hoof. I couldn't doctor this until it grew down low enough for me to get at the hollow, so I pared the foot down as short as I could, and put on an old shoe, but found that he still continued to go lame.

In a month the animal was brought back again, but I could only pare the foot down to the edge of the seedy fissure, not far enough to reach the hollow. I put on another shoe, and told the owner if he was not improved

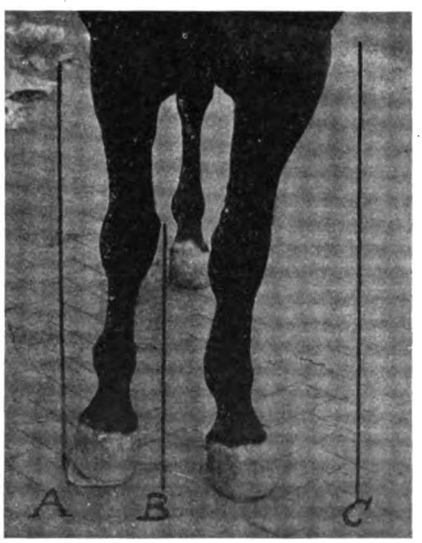
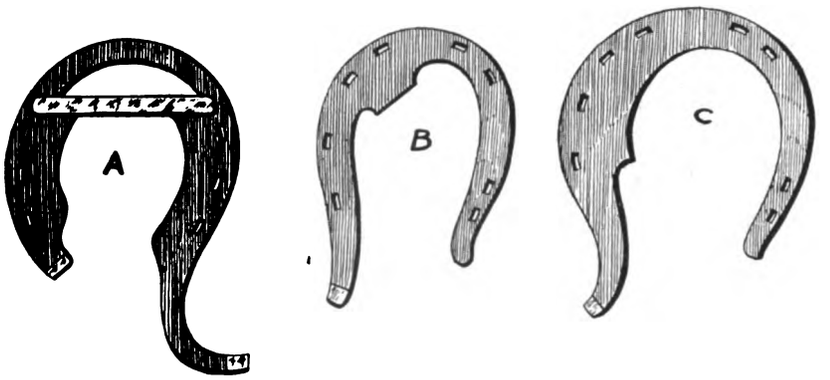


FIG. 4—THE RIGHT LEG IS CALF-KNEED, WHILE THE LEFT ONE IS TWISTED AND TOE-WIDE

in two weeks to bring him back again.

When that time came, the mule was so lame he could hardly put his foot to the ground, so I took the shoe off, and pared the foot down again. It's surprising to see how fast the hoof grows when the animal has that disease. By removing some of the seedy pith, I found that I could get to the hollow, and I found the cavity three and a half inches deep.

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SEVERAL SHOES FOR THE CORRECTION OF INTERFERING

I proceeded to cure this case as follows: I warmed some tallow until it was about as soft as lard, and mixed the tallow with half its quantity of tow, and proceeded to pack the hollow full very lightly. I put the shoe back again, and in a few days he scarcely limped at all. After that I removed the shoe once a month, pared the foot down as much as possible, and added fresh packing. Six months have passed since I first began treatment, and the hollow is at present only ¾ of an inch deep, and the mule is not lame at all.

Of course, it would not do to pack anything hard into the foot, which is very tender. I don't believe in using beeswax or tar as they both set too hard. The tallow softens the hoof, keeps it cool, and is easily removed. I don't believe in removing the outer wall as Mr. Perrin suggests, because sticks and rocks are liable to injure the tender parts. No matter how well a piece of sheet iron fits over the front of the foot, there will be a crack at the top of the iron where the dirt will enter. Besides this, the foot will get too dry when the hoof is removed, and will not keep soft and greasy. I have yet to find a case that I cannot cure by my treatment.

A Few Practical Shoe Styles.

GEORGE F. WHERRY.

The several shoes illustrated are thoroughly practical, as will be found upon applying them for the cases as explained.

At A is shown a weighted shoe for forging. The bar goes across at the toe, while the shoe at the toe is rolling motion.

The shoe at B is for interfering. The weight is placed opposite the point where the horse strikes.

At C is shown another weighted shoe for interfering. The weight is placed opposite the point where the horse strikes. This is a front shoe.

D shows another shoe for interfering This shoe is made straight at XY with the weight on the opposite side.

The shoe at E is for a foot that tends to wear heaviest on the outside. This shoe is designed for the front feet.

At F is shown a shoe to prevent forging. This shoe has a grab toe and two nails are carried in front of the crossbar.

In giving styles or special shapes for particular needs, it is, of course, admitted that one special shape for a special need will not be successful in every case. The foot must be considered, the limb and the action of the horse. It is often necessary to try several shapes and styles of shoes before the required shoe is found. The practical smith will find, however, that a mixture of gray matter with good horse sense and a knowledge of anatomy will go a long way to successfully shoeing the out-of-the-ordinary case.

Thornton's Letters.—9.

Being "Straight-from-the-shoulder" Talk from a Prosperous Self-made Smith to his Former Apprentice, now in Business.

DEAR JIM:

It's such an old one—why not be original?—own up and confess. You have made an error—you know it—I know it—so what's the use of blaming the other chap? Remember, it was away back in nought when old Father Adam said, "The woman did it." Ever since then, people have been putting the blame on some one else's shoulders. Don't do it, Jim, old boy. I don't want you to go wrong. I want you to make good, and I know you will.

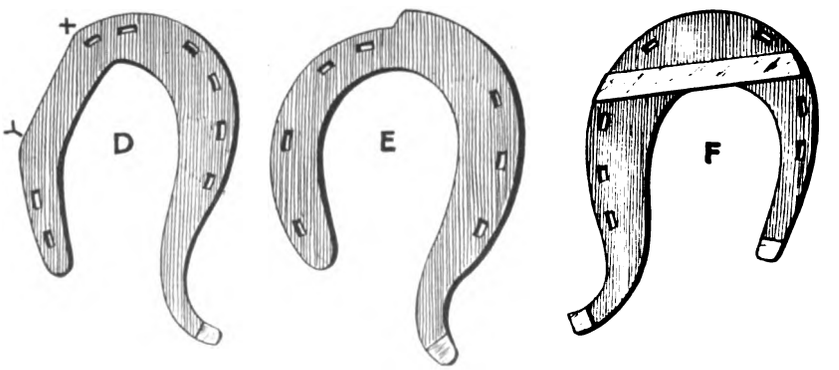
Now, I don't want you to consider this a call-down—that always has a discouraging effect on a chap, and you need every bit of courage you can get your fingers on.

You are probably wondering how I knew that you cut a "wee bit" off your prices. Well, I'm not going to tell you. It came to me in a bit of gossip, and you know that I never encourage that sort of thing. When I wrote you that long, stiff letter about quality and prices, I didn't suppose for one fraction of a second that you would do just what I didn't want you to do. You say, the temptation was so great, you couldn't stand it. Let me refer you to Father Adam again.

Now, look here, Jim. I want you to get some ginger in your veins, right off. Don't dare to go to bed tonight without making a resolution to stir your competitors so thoroughly next week, next month, and for ever and ever that they will say, "Nuf," long before your ginger gives out.

Read over my old letter—yes, I mean the one you simply threw aside as though it were some bum mining investment sheet. Look it up. If you threw it in the fire, sit down and think of what I said. Think hard and long. It'll make your head ache, you'll probably lose sleep tonight, but I want you to get up in the morning and get just as close to nature as you possibly can.

I've figured this letter just about right. If the mails go through O. K., you'll get this on Saturady. I want you to read it through several times, and think about it, and on Sunday I want you to go into the country, take a lunch and listen to a few song sermons from the birds. Just have a good rest—don't do anything else. On Monday, take this letter to the shop



SHOE FOR INTERFERING, ONE FOR UNEVEN WEAR, AND ANOTHER TO PREVENT FORGING

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with you, read it through several times, and think about quality for the rest of your life.

If quality arguments don't win the race for you, there are so many other good, fetching arguments that price cutting need be the last resource. Advertising is the weapon for you to use. Don't for one moment run down the work of your competitor. Let your own work talk so loud in quality that the price charged by the other chaps will not be heard.

Serve up quality-advertising matter to the public all the time. Keep at it continually persistently, everlastingly and you need have no fear as to the result.

To say that I was very much surprised at your temporary attack of stage fright, is putting it mildly. I never thought that your nature was any but the kind that wins a battle or builds a city. If you had told me that you hadn't a good, big bunch of fighting stock in you, I couldn't have been more surprised. I know you are up against it, old man, but its just such times as this one that shows what we are made of.

You say, "Give them a dose of their own medicine." That's not the thing at all. These fellows were anticipating just such a move as this on your part, and when you made it, you can bet your bottom dollar that they were rejoicing. Just surprise them Monday by posting a bulletin on the door of your shop—announce it in your local newspaper, and—raise prices. Don't be afraid of making a good profit for yourself. Remember, I've been up against the same thing right here and know what I'm talking about.

In your bulletin announcing the raise in prices, and in your advertising, don't forget to talk about quality. Refer as little as possible to the other fellows. Let them do as they please. The less attention you pay to them, the better for your end of this fight, and when a steady customer asks about one of your competitors say little. It's the man who uses his hammer on his own anvil who advertises his business most and succeeds. It's not good business to be continually knocking the other fellow, and even the occasional knock sometimes comes back like a boomerang and lands on your own head.

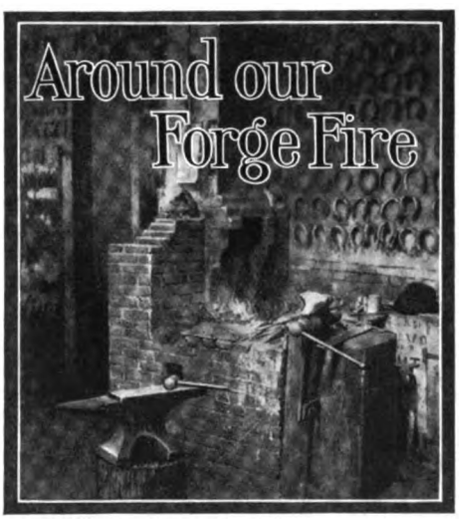
You don't say a word about the engine, Jim. I thought sure you would get busy with one right away. Did you get the catalogues I told you of? If you have not done so, sit right down now and write to all the gas engine firms you ever heard of. Don't forget what I've said about a gas engine. You can use one in a hundred and one ways, and you won't know the advantages of an engine until you get one.

Now, Jim, old boy, keep your brain busy with ways and means and methods and schemes of fighting the price cutters. Put quality at the top of the sheet in capital letters, and let your other schemes come after this, keeping the first word in mind and eye all the time. Let quality be not only the basis of all your schemes but let it be a part of them, and distributed thoroughly among every one of them.

If you don't care to go up against your competitors on the quality basis, just write and let me know. It'll save a great, big pile of time for me, and you won't be bothered any more in reading these sermons.

Before I close, just let me impress upon you the need of quality arguments and a gas engine to back them up. Yours for quality,

Thornton



"Well, Benton, haven't seen you for some time," exclaimed the Editor as the man with the recipe hobby entered.

"I've been down in the country, visiting shops and finding out just what the boys are doing," and Benton settling into his accustomed seat and lighting his pipe.

"I suppose you have lots of new material," returned the Editor. "Let us have some of your new discoveries."

"Well, I guess about the funniest thing I came across was to find a smith using sawdust to clean his hands."

"Sawdust!" exclaimed the Editor. "Don't mean to tell me that sawdust will take the grease and grime off a smith's hands? I didn't suppose anything less than a scrub brush and a cake of scouring soap would do that."

"Just the same, that's what he used," returned the other. "First he poured coal oil over his hands to loosen the grease and dirt and then he rubbed his hands well with clean, dry sawdust. This absorbed the greater part of the oil and grease, and then he used good soap and water. I thought I'd bring that kink along for the A. B.—guess some smiths will appreciate a simple method of cleaning their hands."

"That is a very simple and yet practical kink for cleaning greasy hands," said the Editor. "But Barlow was in the other day and said that the men down at his shop used a cleaner. It sells for ten cents a can, I believe, and can be gotten at most any grocery. The men sift a small quantity into the palm and rub it over their hands, using a small quantity of water. They then use a good, pure soap with lots of water."

"Another little kink I got wise to was how to fireproof clothing," said Benton. "I should think that it would be just the thing for the busy smith to fireproof his working shirt." Here Benton opened his recipe book and read: "Dissolve a one quarter pound of sodium tunstate in one quart of water. When ready to use, pour the quart of solution into four quarts of water and soak the garments or material to be fireproofed."

"That should be of value to smiths, and if clothing is prepared in this way it may often prevent serious accidents," said the Editor. "And it will prevent the smith from going without any shirt, as one smith recommended to another who didn't like the idea of having a new shirt burned full of holes every day or two."

"That was certainly an excellent preventive" laughed Benton, "but not to be recommended for the skin."

Here Jack Mason put in his appearance. "How can I get a good, dull black color on some iron bars for repairing a wrought-iron railing. The railing is a jet black and I want to match it so as to make the repair invisible."

"I think I've got just the thing you want," said Benton, turning the leaves of his book and finally, having found the requested recipe, reading as follows: "Make a solution of 80 parts of cupric sulphate; 40 parts of alcohol; 30 parts of ferric chloride; 20 parts of nitric acid; 20 parts of ether and about 400 or 500 parts of water. Cover the iron to be blackened with this solution. Here is also another and perhaps a simpler method. Mix together one part each of chloride of bismuth and chloride of copper, two parts of bichloride of mercury, six parts of hydrochloric acid, five parts of alcohol, and about 50 parts of clear water. Mix thoroughly. Clean all grease and dirt from metal by boiling in soda solution and then apply the solution. After applying, place iron in boiling water and let remain for about half hour with water at same temperature. If color is not dark enough repeat until of desired shade, then place metal in boiling oil and dry in oven. This will give you a good, deep, dull black."

"Guess I had better get one of the old bars and shade the new one accordingly," said Mason. "I'm ever so much obliged for your tips, Benton. Say, by the way, how can I fix my tools so that the handles will stay fixed and not be getting loose all the time. I've had more trouble along that line than I can tell about."

"Why, just fill the tool handle with powdered rosin, heat the tang of the tool and drive it into the handle," replied Benton. "You'll not have much trouble if you treat your loose handled tools that way."

"Well, now, that's a simple thing. Guess I'll try that with all my tools," and with a nod to the Editor, Mason went out.

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The Toilers.

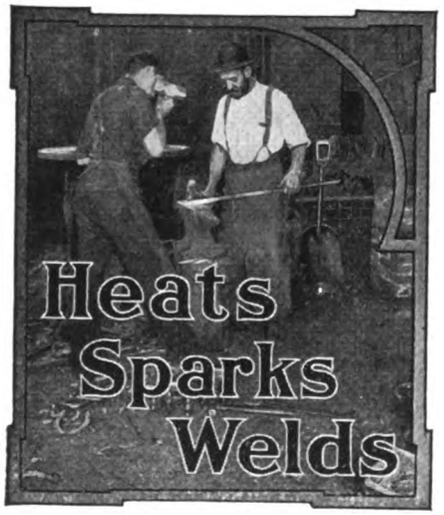
JAMES O. CHURCH.

There once was a time in the days long ago
When to labor was thought a disgrace;
But the worker today, where'er he may go,
Wears never a blush on his face.
Some excuse there might 'been in the days that are past
For acting the fool now and then;
But the toiler has come to his kingdom at last,
And it's up to us now to be men.

How sad the condition of labor enslaved
And crushed 'neath the heel of the rich!
No wonder men fought like demons depraved
Or reveled like beasts in the ditch.
But freedom is ours, we have come to our own.
Tell it out with your tongue and your pen,
By sword and by ballot the wrong is o'erthrown
And it's up to us now to be men.

Then lift up your head, brother, though you may think
Life's burdens are heavy to bear.
Don't try to find solace in drugs or in drink,
For you'll make matters worse than they are.
Keep your head firm and level, your life square and clean,
And wait for the glad morning when
This truth shall more clearly by all men be seen,
That it's up to us now to be men.

Written expressly for the AMERICAN BLACKSMITH.



Never to try means failure forever.

Time is money, but the idler's is counterfeit.

Right now—do it now. Tomorrow never gets here.

He doesn't make anything who never makes mistakes.

A well-filled shop does not always indicate a well-filled purse.

A dissatisfied workman is the worst and most expensive kind.

And again, when your light is under a bushel you can't tell when it's out.

Measure your life by deeds, not by years. On this basis, how old are you?

Business minutes turn to business dollars if every one is counted while doing business.

Don't let the smudgy smoke from the forge of failure obscure your sun of success

Some people wouldn't have anything to talk about if it wasn't for their troubles.

'Tis queer, but a horse is still a horse even after he has turned into a smith shop.

Some smiths earn a living but don't get it—any of them getting a living they don't earn?

He will bear watching who considers his conscience an inconvenient thing to carry around.

As bad to underestimate as to overestimate one's ability—best strike a happy medium.

'Twould cost $700,000,000 to pay hand labor for the work done last year by farm machinery.

Find time to brush up shop a bit. Customers will find it more inviting—and so will you.

A happy, smiling face makes the devil frown—and on a smith it tells people where to trade.

Words and promises are good, in a way—but how much better to back-up good words with good works.

Some men worry for fear the world is underestimating them, when, as a matter of fact, it couldn't.

Experience cannot be bought on credit. You must pay for every ounce you receive before it's delivered.

Make your customers think you are the very best smith in the neighborhood—but see that you are.

If you're a lover of man's best friend, you'll always have a pail or two handy for the thirsty horse.

One a sticker, the other a quitter—that's the difference between the successful and the other kind of smith.

Fine feathers may make fine birds, but the "swell" horse or carriage may belong to a "dead beat" just the same.

Tom Tardy may not be to blame for being placed in the "down and out" class, but it is his fault for staying there.

'Tis poor care, not overwork, that shortens the life of the average machine or tool. And isn't it true of men as well?

Don't wait until conditions get so bad that they must improve. Get busy with an organization movement right now.

Fair dealing begets confidence—confidence promotes business. What sunshine is to flowers, confidence is to business.

Discharge any of the men caught mistreating a horse. Make it a shop rule, let your customers know it, and then live up to it.

Keeping account of your side-lines? Better do so if you don't want to find yourself feeding the profits of one to keep the others fat.

It doesn't pay to lose one's temper. If you must lose it, lose it once and for always—and see that it never returns. Tools only need temper.

Means more today than ever before, and it's been standing for more than five years. Read the "Fair Dealings" paragraph—you'll find it in every issue.

A hungry horse likes many things better than a pat on the nose. And many things will please the underpaid apprentice better than a jolly slap on the back.

Wisdom through reverses—success through failure; thus is our knowledge gained. Experiencing and conquering unexpected conditions is a school of knowledge.

"A stitch in time saves nine," said Tom Tardy as he went around patching up some of the larger holes in the shop floor, which now looks like an old-fashioned patch quilt.

Some smiths can do more good work with a 39-cent outfit than others can with a 39-dollar kit—but a good workman with poor tools is a better workman with good tools.

Ever see an experienced steel worker nick a bar of steel with a cold chisel preparatory to breaking the bar? No sir—he cuts it with a hot chisel when the bar's at a low heat.

What's your choice? Would you rather make a profit of $2,000 on a business of $40,000 a year, or the same profit, or even a little less on a business of $10,000 yearly. Think it over.

Many a man has failed because unable to grasp the relative value of the big things and the little things. Paid too much attention to the latter and has no time left for the former.

When all a man knows is in his head and this little has been there so long it's grown to him, of what benefit is it? Exercise of brain is as necessary to healthy growth as exercise of body.

Every state in the Union, every province in Canada, and thirty-nine foreign countries—that's where THE AMERICAN BLACKSMITH visits every month. And what's more—we're still growing.

While some long-haired inventor is trying to invent a horseshoeing machine, the best substitute is a gentle-voiced horse-lover with firmness and horse sense who uses his hammer to hit nails only.

Organization is the bridge over which hundreds of craftsmen are passing from low prices and hard times to better profits, protection, and harmony. Ask the secretary for a pass over this bridge today.

What does it profit a man when prosperity is abroad in the land and the prices of everything soaring, if he doesn't raise his charges in proportion, too? And don't wait till your customers tell you to put up prices.

"All work and no play makes Jack a dull boy," said Tom as he shouldered his fishpole and disappeared in the direction of the river. Friend Tardy evidently doesn't know that all play and no work makes Jack a "jack."

"Better get an up-to-date forge," said the visitor. "Oh! this soots me all right," replied Tom Tardy, as a gust of wind brought a cloud of dirty, black stuff down the chimney and into the shop. Tom is quite a humorist in his way.

The "Sunny Southwest" offers a good opportunity to some good, practical, ambitious smith. Dr. Charles M. Grover of San Rafael, New Mexico, describes this locality on page 240 and invites our readers to write him if interested.

Study to hold every customer. Wouldn't your business be on Easy Street now if you had never lost a patron once gained. Look 'em up when they stray—try to keep every one—except, of course, the dead, the dead beats and the move-aways.

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A recent strike of railway employees in Bulgaria was settled by the authorities summoning the strikers for military duty, all being of the army reserve. They were then drafted into the engineer corps and detailed for duty on the railways.

"Where's the tire-setter?" asked the new arrival, leaning against the anvil. "Tire-setter!" exclaimed the anvil. "This is Tom Tardy's shop—you'll never find a tire-setter here." The wheel groaned audibly. "Well, I can see my finish right here."

In black and white should be every transaction. When a customer owes, you, of course, put it down. But do you record what the shop owes you? Do you give it credit for what it pays you back? It's business, and business must be run on a business basis.

Lots of ads there are these days that should not be answered. You'll not find 'em in "Our Journal" though—our Pink Stamps and Honest Dealings Paragraph guarantee it. Better go through the paper again for fear you've missed some good chance for profit.

Weeds in lawn and garden—dig them out. And while you're at it, clean up the shop and business weeds too. Haven't any? What about bad accounts, profitless jobs, and waste? If allowed to grow, they'll crowd the tree of business entirely out of the trade garden.

Friends—none of us has too many. Kind acts are the friend-makers—even a stranger will thaw out under the sunshine of a kind deed. Pass the good things along—use THE AMERICAN BLACKSMITH to make friends. Look over this copy with your neighbor—ask him to become one of us.

American Association of Blacksmiths and Horseshoers.

Have you sounded the craftsmen in your county? How do they feel toward the association movement? It's a pretty safe guess that they are in favor of it. If you have not yet found this out, why not question them on the subject today—now—while the matter is fresh in your mind? Smiths all over the country are enthusiastic about organization and the protection which it secures for them.

Why don't you, Mr. Reader, get busy on this organization problem in your county? Mr. E. W. Prather of Mason County, Kentucky, asked for plans several months ago. Mason County has now one of the strongest and most promising associations in the country. Smiths have raised their prices to a common footing and are as busy as bees working for the good of the craft in their county.

Why not follow Mr. Prather's example? An almost unlimited amount of good can be done with a good, strong, wide-awake county association. Don't wait for the other chap to start this movement in your county. You take the helm and steer the craft ship into the sea of better prices and harmony. Your brother craftsmen will gladly help you if you but approach them on the subject. Make the suggestion and give them a chance to air their views on the matter. You can be positive that they will be with you, every one of them.

Don't be discouraged if some Tom Tardy chap refuses to join hands with you. Don't pay any attention to these fellows. They will see their mistake when they see the advantages to be gained in joining a good, strong association.

The progressive craftsman owes it not only to himself but to his family to get a fair price and a fair profit for his work. When he does not get a fair figure, he is simply feeding some one else's family, instead of his own.

If you, Mr. Reader, and your brother craftsmen in the county are not getting what you deserve—if you are working for little or no profit—if the "dead beat" and "slow pay" customers are feeding and clothing their families with money that rightly belongs to you, get busy now—today—with plans for forming a good, active, bristling, county association for your protection.

Address me today, P. O. Box 974, Buffalo, N. Y., and by return mail will come my easy plans for forming branch associations. These plans have been followed with success by smiths all over the country, and you may be sure that they will be successful in your county with a hustler behind them.

Will you be the hustler for your county? Will you gain for yourself the everlasting thanks of the craftsmen in your locality? Here is a chance to do the most possible good with the least effort.

A postcard is sufficient for a request for these plans, and it will take but a few seconds of your time to address one to me. And it will mean dollars in your pocket, Mr. Reader. Will I hear from you today?

THE SECRETARY.

The Need of Organization in the Smith Craft—2.

JOHN WARNER.

The Remedy.

The profession of blacksmithing is just as honorable as that of any other trade, when conducted legitimately, and therefore, it is entitled to the consideration of justice. How few blacksmiths there are who ever accumulate wealth by working at the trade! How few there are who rise to positions of influence! How few there are who can send their boys and girls to college! What the smith craft needs is protection by way of co-operation—a pooling of interests. What we want is state and national co-operation divided into counties. Each county knows its own conditions and requirements best, and my suggestion is that the blacksmiths and allied craftsmen of each county get together and employ the very best one of their number to visit each shop in the county, to talk to the smith as much of the day as seems necessary toward establishing a uniform scale.

Who can truthfully say that we smiths are thoroughly up on price making and costing? Many of us do not know whether we are charging too much or too little for work. Many are doing work on which they do not make a living, and some don't seem to know it. I suggest that the man employed to visit the shops make engagements long in advance, so the smith may know and be prepared for his visit and do nothing else that day. The visitor will be thoroughly posted on both cost and selling prices—the proportion of profit the smith should have, and all matters pertaining to shop management and successful business methods. He must know what he is talking about when he says: "You charge 40 cents for that clevice. The iron costs you 15 cents, the coal 5 cents, and it took you half an hour to make it. Your time was worth 30 cents and your material 20 cents. This is 50 cents and you only get 40 cents, you lose 10 cents on the transaction. But this is not all. Where's your rent, insurance, and other expenses?" and so on—the price-maker goes over each item, showing the smith just what he should get for his work and how to get the advance from his patrons.

Who says there is not urgent need for such an organization as that of which I speak? Conditions have naturally changed in late years. The cost of materials, and the cost of living have advanced. Wages, too, have advanced slightly. But the smith has got to stay in his shop, day in and day out, busy or not busy. Any man who uses his power or abilities to a reasonable degree is entitled to more than a bare living. It is not only every man's privilege but his duty to fortify himself against uncertainties—be prepared for emergencies.

Now fellow workmen, I appeal to you that if this idea I have advanced strikes a tender cord in your composition

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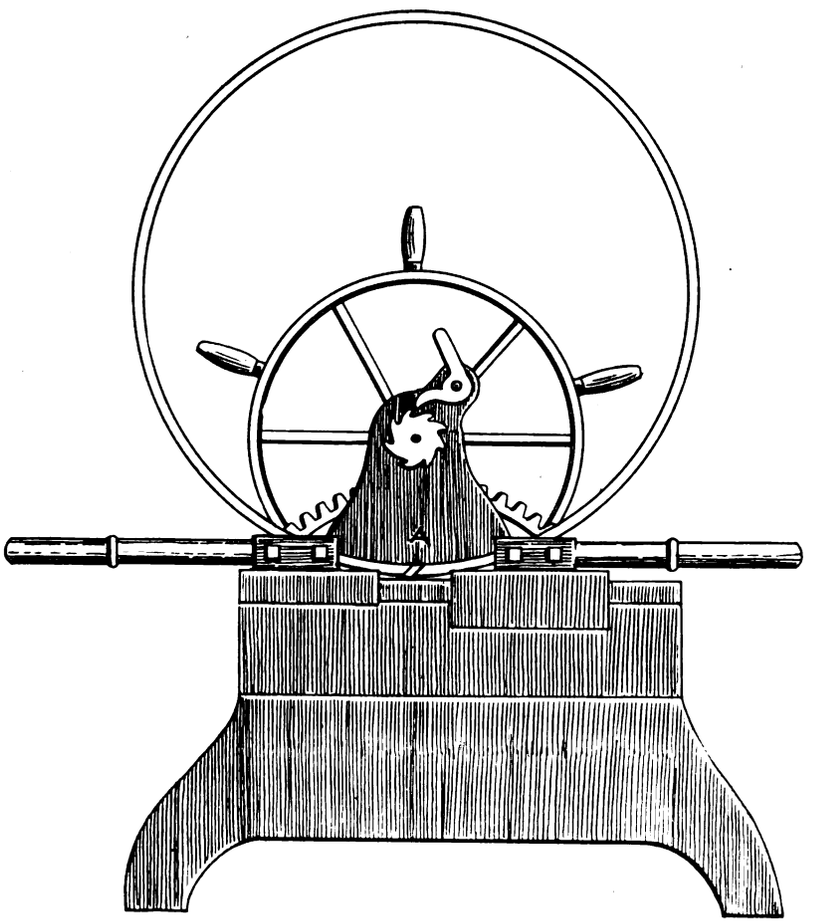
you say so. If I'm right, I want encouragement; if wrong, I want to be corrected.

How to Weld Heavy Tires.

NELS PETERSON.

The accompanying engraving will give you a little idea for welding heavy tires that hasn't appeared in "Our Journal," or at least hasn't come to my notice. This little kink will save a good many hard blows, and by this method welding can be done much quicker than lap welding.

To start with, lay the tire on the floor, roll the wheel over it to get the length and mark with cold chisel. Now heat and cut so that the end will be level. Take a short piece of band iron, and fit it to the rim of the wheel. When starting to bend tire, place band iron on tire and see that you have the proper curvature. Now travel your wheel, then the tire, and cut other end of tire also level, but in such manner that when the ends are together, it will fit like a short lap as shown in cut at A. When your heat is ready for welding, place the tire in the tire-shrinker as you would for upsetting, and let the helper turn the wheel on the shrinker. Now with a heavy hammer or light sledge, hammer down the weld. You here have a combination butt and lap weld that is hard to detect; the tire being upset while welding, it can be drawn down to size on anvil to a very smooth finished job. Heavy axles can also be welded by this method except that the ends are cut straight instead of slanting.



PLACE THE HEAVY TIRES IN THE TIRE SHRINKER WHEN WELDING THEM

Who Can Explain This?

W. W. WATT.
South Africa.

Two motor car wheels were brought in for repairs the other day. They were 22 inches in diameter, with 12 spokes and bent rims. These rims were removed and a new rim of 4 felloes with 3 spokes in each put on.

After going through the wheelwright's hand they were passed on to be turned. Being small, they were chucked in the screw-cutting lathe instead of being placed in the machine especially for this work. The wheels must, of course, be made to fit the tires, and as the latter were to be put on hot there must be some allowance for draw. Naturally, then, the job must be very accurately measured.

After turning one, the man ran his traveler over the wheel, and then, for what reason I don't know, he went back of the lathe and measured again. To his surprise the traveler showed a difference of $\frac{3}{8}$ of an inch, the measurement from behind the lathe being the larger. The traveler used was of American make and measured 24 inches in circumference. Several workmen in the shop besides the foreman, and even the proprietor, ran not only the same traveler but others as well, but all showed the same result. A tape was then tried, but this measured the same both ways. I then tried the wheel with my own traveler—running it twice each way, but with the same result. The wheel measured $\frac{3}{8}$ of an inch larger at the back of the lathe than when measured from the front.

Many will, no doubt, laugh at this, and say there can be no difference. It is, however, a fact, and I would, if anyone can, like to have an explanation of the matter. I will in the meantime withhold my explanation. I may say that I ran a wheel outside the tire and found both ways alike, nor would it be different on a handmade wheel.

A Shop-Made Spoke Tenoning Machine.

A. E. FREEMAN.

A good serviceable spoke tenoning machine can be easily made by any good, practical smith in a very short time, and at little expense. Referring to the engraving, XXX is a good stout piece of 4 by 4-inch hard pine. The length of this piece will depend upon the distance between your floor and your line shaft. The center of the tight pulley on your auger shaft should be in line with the top of the pulley on the line shaft. With this in view you can figure other distances accordingly. A and B are the tight and loose pulleys on the augur shaft YYYY. The belt connecting the auger shaft pulleys with the line shaft pulley is shown at C. The brackets DD hold the auger shaft in boxes. The oil holes EEE are for thoroughly lubricating the auger shaft boxes and are drilled slantingly, as shown. The rod F operates the belt shifter by means of the handle Z. A spring G holds the lever H in position. The lever shown at H is for raising or lowering the auger shaft by means of the collar J and its connecting rod. This collar fits loosely around the auger shaft, while pins above and below it enable the operator to lift or lower the shaft. The head at K is fastened on the end of the auger shaft and enables the operator to easily fasten a drill or auger in the machine for operating. The rod L has a spoke hook or vise at the end of it for holding spokes firmly when cutting tenons. The rod at M is for holding

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wheels when working on the rim. This may be substituted for the fork at R when working on fellows. A steel bar at N is twisted at one end. This end goes up into the spoke holder and grips the spoke. At its lower end it is linked to the foot lever O by means of which it is operated. The dash lines at P show the slot in the 4 by 4, by means of which the wheel rod M and the spoke vise at L can be raised or lowered for different sized wheels and spokes.

We also use this machine as a drill. In setting up, the auger shaft should be about 20 inches away from the 4 by 4, so as to give the operator plenty of room to put large material in the machine. If the smith has a set of bevel gears, he need not have the auger shaft so long, and he will not need to run his belt with a quarter twist. The fork for holding felloes and the spoke vise are both made of ¾-inch mild steel.

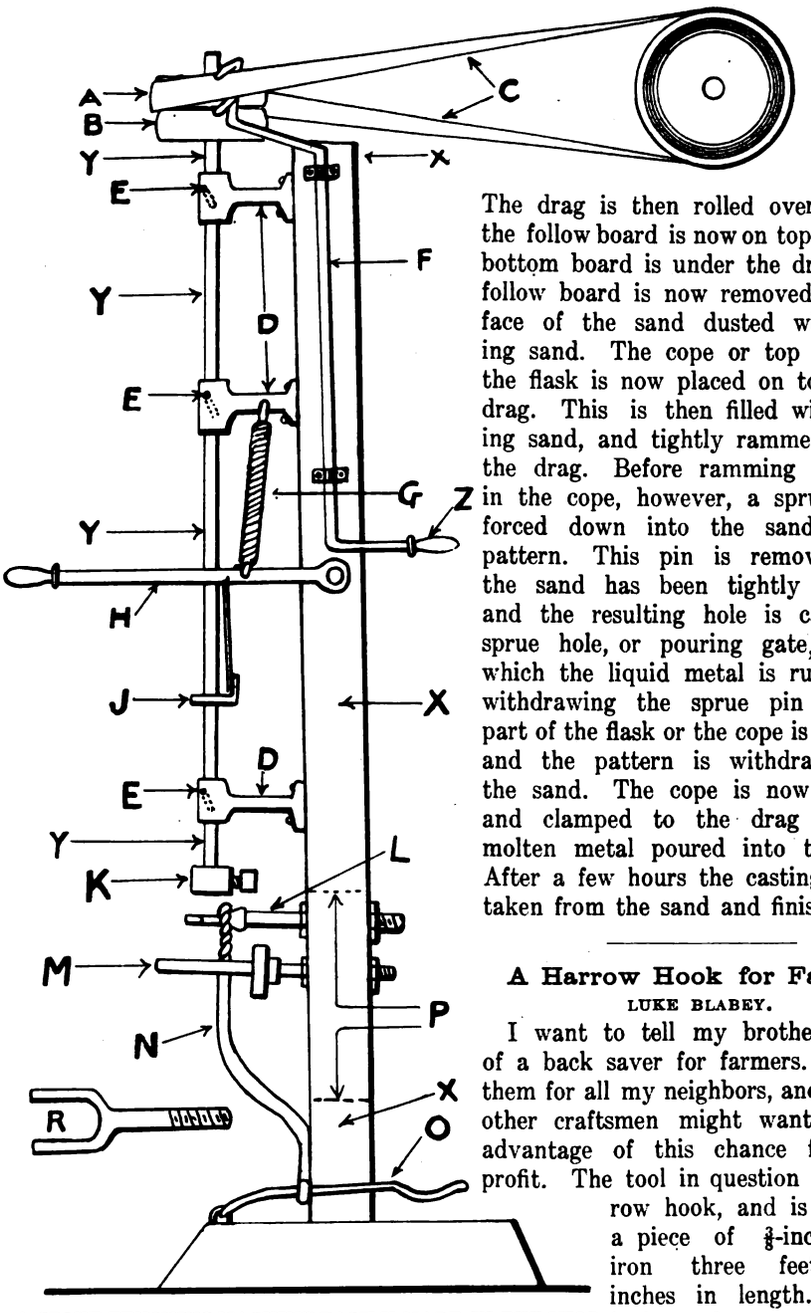
A Few Practical Hints on Foundry Practice.

R. H. SOMERS.

An AMERICAN BLACKSMITH reader in Mexico asks what is used between two molding boxes to keep the sand in the upper box from sticking to that in the lower box. A parting sand is sprinkled over the surface of the joint before the upper box is placed in position. This sand is specially prepared for this purpose. It is generally made from the sand which sticks to the castings. This sand has been burned—the clay particles in it have been thoroughly dried, and for this reason it prevents the two damp portions of green sand from sticking. Parting sand can also be made from fine grades of common shore sand. This is dried thoroughly on a hot plate and then sifted through an extremely fine sieve. An old flour sieve is just the thing for this purpose. After the joints of the mold have been properly finished, the parting sand is sprinkled over so as to distribute it evenly and uniformly over the joint. This prevents the disagreeable sticking which our Mexican reader desires to overcome.

This reader also asks for an explanation of the construction of a furnace for melting brass in a crucible. A furnace of this kind was described very fully in the September issue of 1906. Full directions were given as to its construction, its charging, and operation. As to fuels, charcoal and coke are best for melting brass. When best results are to be obtained, charcoal is given preference.

A Colorado reader desires information on the making of molds. He writes to say that he desires to "make small castings in the shop."



A SPOKE TENONING MACHINE EASILY MADE IN THE SHOP

A full explanation of the making of molds and molding would fill a volume. I will, therefore, give but a brief outline of the operations. Should anyone desire a special explanation of any particular branch of the operations same will be given on request.

It is, of course, understood that a pattern of the finished casting is made first. Briefly, this pattern is laid on what is called a follow board. A drag is then placed around the pattern and molding sand is lightly rammed into it and down against the pattern. When tightly rammed a bottom board similar to the follow board is placed on top of the drag. This board, and the follow board are then clamped together with the drag between them.

The drag is then rolled over so that the follow board is now on top, and the bottom board is under the drag. The follow board is now removed and the face of the sand dusted with parting sand. The cope or top part of the flask is now placed on top of the drag. This is then filled with molding sand, and tightly rammed as was the drag. Before ramming the sand in the cope, however, a sprue pin is forced down into the sand to the pattern. This pin is removed after the sand has been tightly rammed, and the resulting hole is called the sprue hole, or pouring gate, through which the liquid metal is run. After withdrawing the sprue pin the top part of the flask or the cope is removed, and the pattern is withdrawn from the sand. The cope is now replaced and clamped to the drag and the molten metal poured into the mold. After a few hours the casting may be taken from the sand and finished.

A Harrow Hook for Farmers.

LUKE BLABEY.

I want to tell my brother readers of a back saver for farmers. I made them for all my neighbors, and thought other craftsmen might want to take advantage of this chance for extra profit. The tool in question is a harrow hook, and is made of a piece of ⅜-inch round iron three feet three inches in length. Fifteen inches of one end is used to form a D handle, and one inch of the other end is bent parallel with the handle. The finished hook should look as shown in the engraving. If any smith will make some of the hooks, hang them up in the shop, put on a price tag and a sign telling what they are, he should sell one to every farmer customer owning or using a harrow.

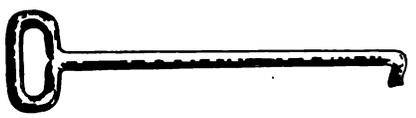
How to Harden and Temper an Axe Properly.

A. F. FRANCIS.

The first requisite is a good clean fire, well coked and large enough to

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heat the entire cutting edge of the axe. The fire should also be deep, so that no cold air from the blast is likely to reach the blade. After getting an ideal fire, heat the cutting edge of the axe to a

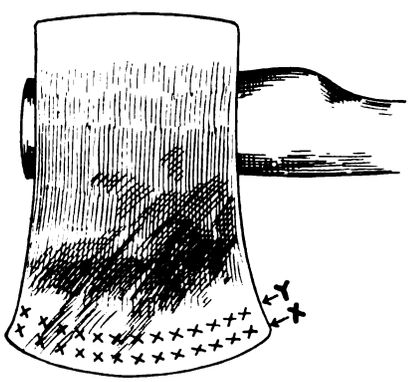


A LITTLE HELP FOR FARMERS

strong yellow. Exercise care, so that the heating will be done evenly and uniformly. Now hammer along the edge of the axe as shown by the little crosses at X in the engraving. After hammering across one side turn your blade and proceed with hammering on the other side. In hammering draw the blade out toward the edge and continue your pounding until the heat begins to get low, but not after that. Now reheat the cutting edge to about the same color as before and for a distance of from 1½ to 2 inches from the edge. After heating proceed with hammering as before, but at line Y, or about 1½ inches back from the edge of the blade. After hammering one side turn and hammer on the other side of the blade.

At this stage of the hammering the smith will notice that the blade has widened considerably. Do not under any circumstance attempt to hammer it down to the desired width. In fact, it is best to not touch the edges of the axe with the hammer at all.

Now heat the blade for the third time and hammer again across both sides at the line Y. This third heat is a very low, one and should be such,



TO PROPERLY HARDEN AND TEMPER AN AXE REQUIRES SKILL

so that the hammer will leave a bright gloss on the blade. The superfluous metal at the sides of the blade is now cut off and the edges filed smooth. The blade is now ready to harden.

Now heat the axe to a cherry red from its cutting edge for a distance of about 1½ to 1¾ inches back. Then dip the blade into the hardening bath and move it up and down. Now polish the blade so that the temper color can easily be distinguished, and heat very slowly over the fire until the blade shows a blue. Then cool the blade and grind.

The practice of cutting off the superfluous metal with the chisel instead of hammering it down with the hammer is also recommended when forging chisels and other cutting tools of similar design and construction.

Two Little Paint Shop Helps.

A. B. MORGAN.

We use two little kinks in our shop that will no doubt be interesting to readers of "Our Journal." One little help is a brush keeper. It is simply a pail with hooks on the inside upon which to hang the brushes. We took a common ordinary candy pail, which we secured from the grocer, and painted it inside and out with two coats. We then put a row of hooks on the inside of the pail about two or three inches from the top. When finished with a brush we simply hang it in the pail into which a sufficient quantity of water has been poured to just cover the bristles of the brush.

In this connection it may be well to mention that to place a brush into water before it has been touched by paint is to ruin it. The water will make it soggy and practically unfit for painting use.

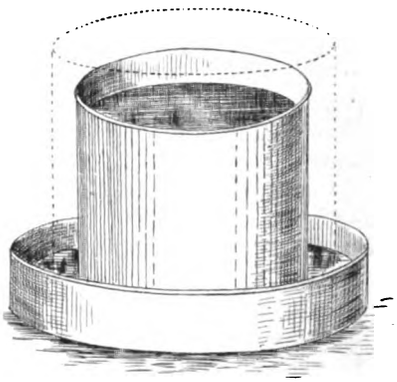
The other little contrivance we use consists of a round, shallow pan such as can be procured at any hardware store and a deep tin, slightly smaller in circumference than the shallow pan and deep enough to receive a color cup. These tins are for the preservation of mixed colors. The shallow pan is partly filled with water and into this is placed the cup of color. The large deep tin is now inverted over the color cup and provides an air-tight and dust-proof compartment for the color. These color preservers can be purchased very cheaply and as many used as necessary. It often becomes necessary to hold mixed colors from day to day in the shop and by this means there is no danger of their drying up or crusting over. Putty can also be preserved in this same way.by placing it in a color cup and covering as in the case of the paint.

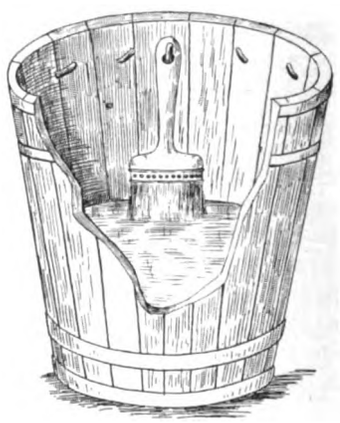
The illustrations are self-explanatory and nothing further need be said regarding the making of these two little paint shop helps.

How to Braze Cast Iron.

I. M. SEAMAN.

In order to braze iron properly make a clamp suitable to hold the casting in place to a perfect fit while heating. Then take wrought iron filings or saw filings or the cuttings from a hack saw, mix with a little very fine borax to the





TWO LITTLE PAINT SHOP KINKS THAT WILL SAVE BOTH TIME AND MONEY

consistency of paste with clean water. Put a small quantity of this mixture in the joints that are to be brazed, spreading it evenly and then clamp together securely and with as perfect a joint as possible. Fill all the crevices and breaks with the paste.

Now heat the joint slowly and evenly, and at the same time see that the pieces do not move while they are heating. When the joint is hot enough to melt brass, take a piece of wire spelter, long enough to hold in your hands, and hold the end directly on the joint till a good quantity has melted, and run into the joint. Before putting the spelter on, you may place a small quantity of borax on the outside. When a sufficient amount of brass is melted, let the casting cool in the fire so as not to disturb the

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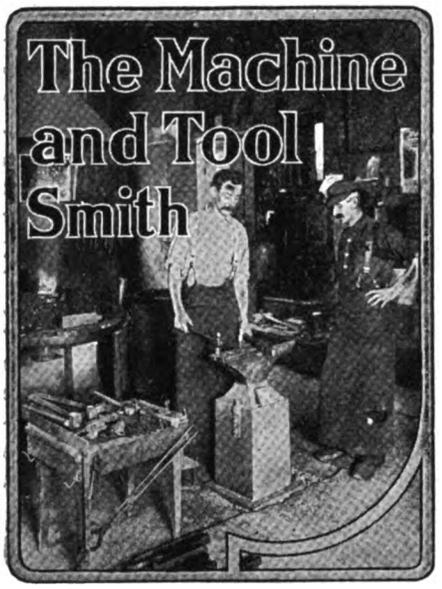
joint when done. Do not cool in water, as it makes your casting too hard.

Practice this before you take a difficult job. It is easy, and is just as good as the expensive processes that are going the rounds, and it costs you practically nothing to try.

A Simple Method of Repairing Broken Cogwheels.

E. A. BARNARD.

My way of repairing broken cogwheels: First, file or grind down to the bottom of the tooth and drill a hole, or a number of holes, according to the width of the cogwheel. Then tap and insert cold rolled steel plugs to fit. Cut the plugs the height of the other teeth, taper them, and you have a good job in a very short time.



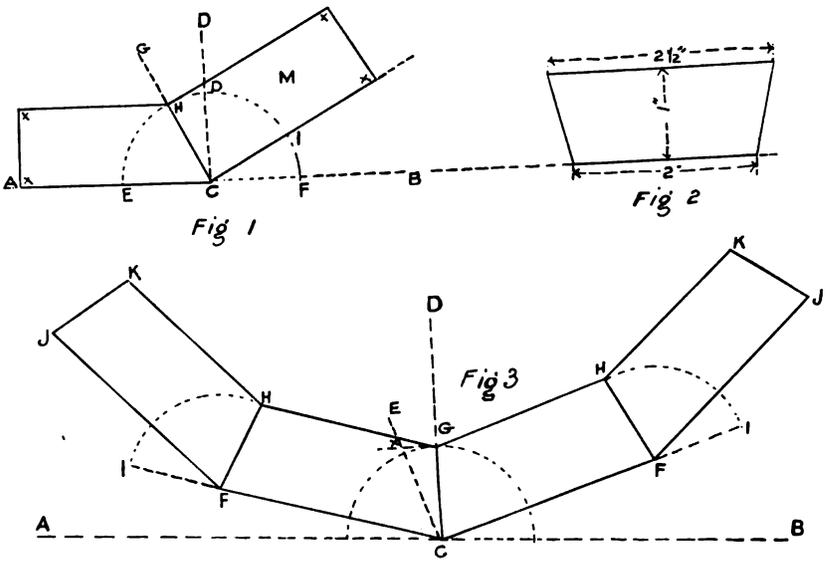
Beveled Corners and How to Forge Them.

W. HUDSPETH.
Australia.

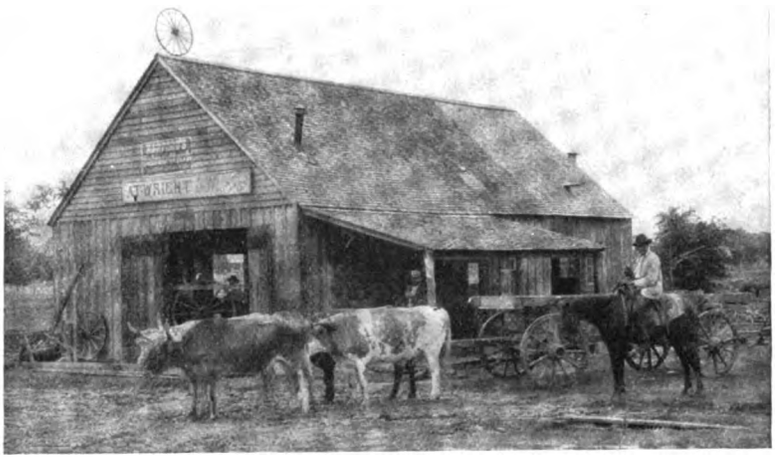
A blacksmith is very often called upon to forge beveled corners and if he has no knowledge of drawing or elementary geometry, he is at once puzzled, as any attempt to forge them without this knowledge is sure to end in failure. Fig. 1 shows a quick, simple method for forging a right-angle corner with a piece of flat iron with one side laying in at an angle to the perpendicular. Take, for instance, a corner has to be forged so that while it is setting flat on the levelling plate one side will be upright and the other side of the square will be leaning in at an angle of 30 degrees. Draw the line AB, Fig. 1, and another line CD at right angles to it. Now describe the semi-circle EF, the size of which may be of any moderate dimension. Draw the line CG, by cutting the semi-circle at H, at an angle of 30 degrees to the upright CD and mark off FI at 30 degrees to F. The line CX, along the base line and the line CX passing through I are then drawn and the top corresponding lines HX and HX are then filled in, the length of which depend of course upon the size of the forging.

When the piece of paper is cut out along the lines XXXX and bent to a right angle at the line HC, it is placed on a level surface and it will be seen that one side will be upright and the other square will be leaning in exactly the angle wanted, namely, 30 degrees. If the forging is a light one, the paper is pasted on the iron, and the iron is cut out the exact shape of the pattern. If a heavy forging, the two pieces of iron are welded at HC. It will also be noticed that the angular piece M is to be wider in proportion to the distance it is leaning in. If the job has to be set at any other angle, the only alteration that is necessary is the distance of the angle DH and FI, which of course must be marked off, as the angle specified.

Fig. 2 shows one side of a beveled square band, the width at the top being 2½ inches, and the width at the bottom 2 inches. Fig. 3 shows its development or the shape and size the plate has to be forged and cut out before it is bent at the corners. Draw the lines AB and CD and the semi-circle precisely in the same manner as in Fig. 1. From the base line AB, a quarter of an inch is marked off on each side of the semi-circle, which is the exact distance each side is leaning over. Lines are drawn through these marks to FF, the exact length of the top side of the square and joined with upright lines HH, which are the exact length of the bottom of the square band. Now draw the arc HI and mark half an inch from I, and again draw lines FJ and HK, the same

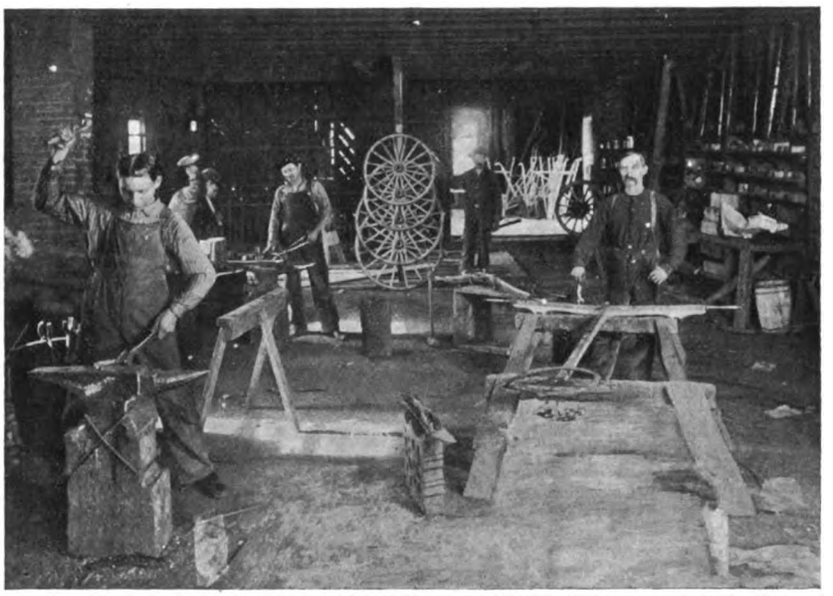


THE FORGING OF BEVELED CORNERS IS REALLY SIMPLE WHEN YOU KNOW HOW



MR. A. T. WRIGHT'S SHOP IN TEXAS, WHERE ALL KINDS OF GENERAL WORK IS TURNED OUT

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A GENERAL SHOP OF TENNESSEE RUN BY MR. W. E. GUNSELMAN

length precisely as the width of the band. This will complete the drawing. The paper is now cut out and pasted onto the plate of iron as in the previous case, or, if the forging is to be a heavy one, pieces of iron are welded at CG, HF and HF. The width of the iron must be, needless to say, wider than the finished depths of the band to allow for the distance taken up in the bevel. The distance from C to X on the line CE gives the width of the iron necessary providing the height of the semi-circle is the height of the band.

To forge this beveled square, the four pieces of iron are cut off at the angle shown in the drawing and welded with a short scarf and then bent. For the last weld, which finishes the job, a lip is formed on the inside of one end, and the other piece comes up against this lip, which makes a very simple weld.

In a well-known engineer's shop some time ago, the smiths were called upon to forge a number of these corners. They straightway bent the corners square and then tried to beat the sides over to the given angle. Imagine the results; the corners were unshapely, and when each job was placed on the leveling plate, it was found that no amount of sledge hammer persuasion could induce them to sit level. The next morning the job was started afresh. This time they were supplied with the necessary drawings and it was surprising with what ease and speed the forgings were finished.

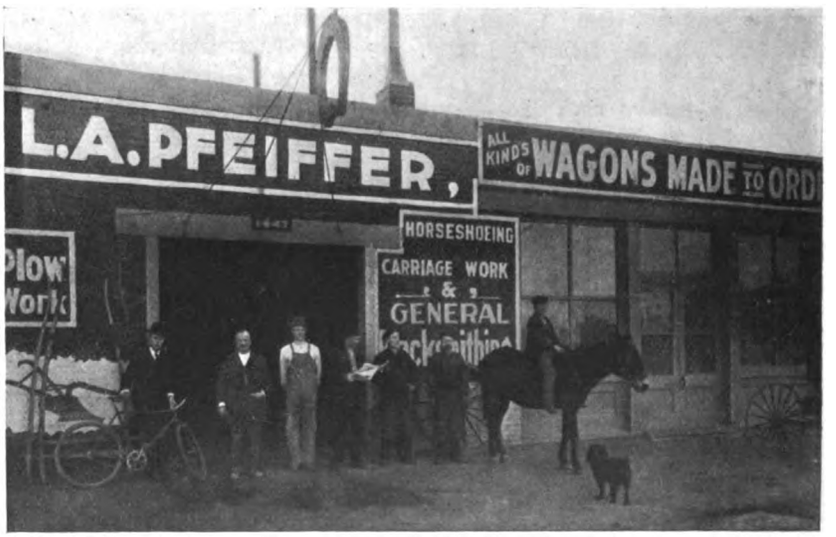
The Grindstone and Tool Sharpening.

J. W. JOHNSON.

Proper tool grinding requires proper care of the grindstone. The first requirement is to get the proper stone for the work to be done. This can usually be secured by advising the jobber for just what you desire the stone. The texture of stones varies widely, from very minute grains to the extremely coarse. There are also several degrees of hardness and softness in stones, and this is also to be considered when purchasing. In an extremely hard stone the surface usually glazes quickly while in a comparatively soft stone the surface wears faster, cuts rapidly, and a new surface is being continually exposed.

When the grinding surface becomes glazed it must be ground down, as the smooth, glassy surface offers no points for grinding action. This grinding of the stone is usually accomplished with a bar of iron or steel, or a very good grindstone truer may be made from a piece of common gas pipe. There are also special patented contrivances on the market for trueing grindstones. All appliances are used in about the same way, however; i. e., the end of the bar or pipe is held against the face of the wheel with the object of wearing the glaze off uniformly and evenly. In finishing the stone it is usually best to finish the face slightly convex, as the tendency of the stone is to wear hollow because of the grinding being done at or near the center rather than toward the edges. In trueing the stone it is also well to true the sides or edges down for two or three inches, as these are sometimes used for grinding certain tools.

The watering of a stone is usually accomplished by allowing the water to drip slowly from a feed can hung over the stone. The tool is then held on the face of the stone at or near the dropping water. It is best, however, in this method of watering, to suspend a piece of cloth from the drip can, allow the water to drop on this cloth, which touches the entire width of the face of the wheel, and by this means an even distribution of water is secured. The old method of filling a trough under the stone with water is too mussy for up-to-date methods, and unless the water is emptied after using the stone or unless the stone is lifted free from the water, the stone will be injured and softened by constant contact with the water. The water dissolves the cement which holds the sharp cutting particles of the stone together, and if left standing in the water long enough the stone will be next to worthless.



A WELL-EQUIPPED SHOP OF COLORADO WHERE GENERAL WORK IS DONE

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To properly use a stone is not to hold a chisel or other tool on it until a groove is cut or worn in its face. It is absolutely necessary to the long life of the wheel and to its trueness to move the tool across the face of the wheel so as to wear it evenly and uniformly.

Grindstones are usually run so as to have a peripheral speed of from 600 to 900 feet per minute. They should not be confounded with emery wheels as to speed limits. The stone being less compact than the emery wheel, the possibility of bursting at high speed is, of course, increased.

It is, of course, necessary to have a tool-rest when using the grindstone, so as to insure not only the perfect sharpening of the tool but to keep the stone as true as possible.



A LARGE POWER SHOP OF WEST VIRGINIA EQUIPPED FOR ALL KINDS OF SMITH WORK

A Well-Equipped General Shop of Colorado.

FRANK M. BRISCOE.

The accompanying engraving shows the shop of Mr. L. A. Pfeiffer. This is the most completely equipped shop in the suburban districts. It is fitted with three fires, a punch and shear, a band saw, emery wheels, a drill press, a power hammer, a paint department, a wood shop and a general work shop all separate from each other. All machinery is operated by power, and the shop is lighted throughout with electricity.

A Power Shop of West Virginia.

D. H. FELTNER.

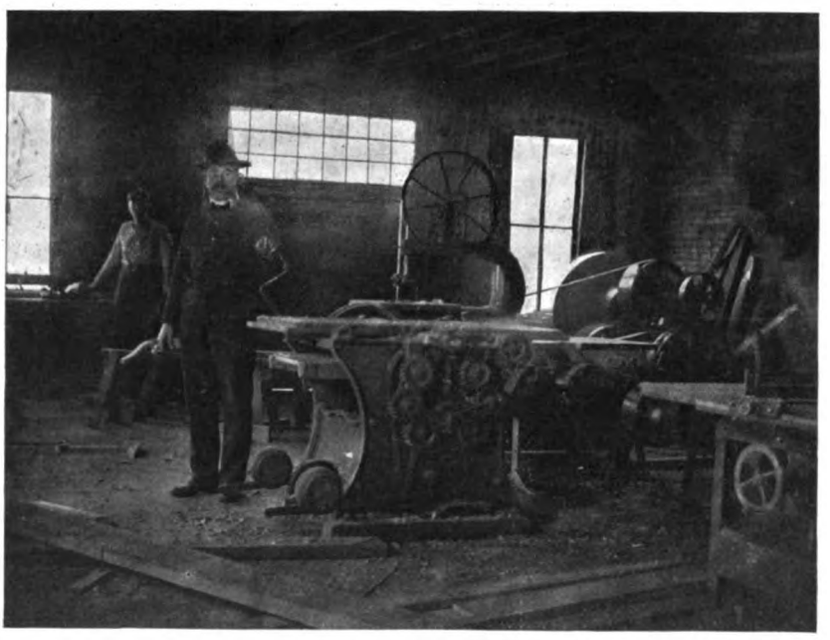
The development of a paying business is largely due to the installation of labor-saving tools. My blacksmith shop is equipped with a power hammer, a drill, bolt-threading machine, a new Doty sheer, a 6-fire blower, a cold tire setter, a tire and circle bender, a twist-drill grinding machine, a tire bolt machine, and an emery grinder and polisher. My wood shop contains a planer, a jointer, a rip saw, a cut-off saw, a sand belt, a drum sand machine, a boring machine, a rubber tire machine, and a Little Giant hub boring machine. A 25 H. P. gas engine supplies all the power for the machines that I use.

All kinds of work in blacksmithing and wood working is done here, from the shoeing of horses, and tne repairing of buggies and wagons to the building of all kinds of pleasure and business vehicles. The blacksmith shop is 35 by 85 feet, and the woodshop and painting department is 35 by 105 feet. The trimming room is 35 by 40 feet, making a total floor space of 8050 square feet.

Most readers would infer that it has taken a great amount of capital to start a business of this kind, but such is not the case. Less than five years ago, I started in business with $200 capital, and absolutely no experience, as I never worked a day in a shop in my life, until I purchased this one.

At first I employed only two men, but since then I have been continually increasing my help, until now I employ seven first-class mechanics, beside myself, and we have more than we can do at good prices. Our motto is to excel all of our competitors in the different branches of business, and to do this I use only first class material, and charge accordingly.

I feel that I owe the AMERICAN BLACKSMITH a debt of gratitude for the way it presents the different things of interest. Nor can its usefulness be confined to its reading matter alone, for the mechanic is especially assisted by the advertisements it contains of the different tools that aid him in his work.

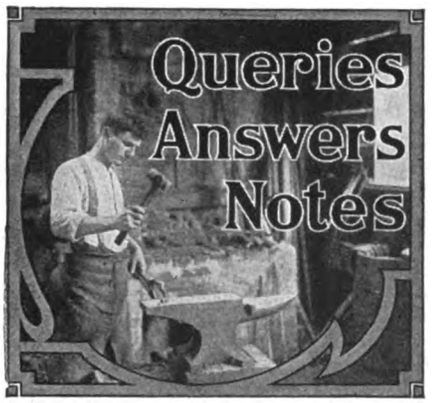


THIS WEST VIRGINIA SHOP IS WELL EQUIPPED WITH POWER AND LABOR-SAVING MACHINES

Advertising the Smith Shop.

The sign over your smith shop door is seen only when people come to your shop. Why not bring the sign to the customer and the man you want as a customer? The nearer your sign is to the would-be customer, the oftener he sees it, the better he knows you and the more likely he is to trade with you. You can place your sign in his home. How? Watch for our special calendar offer for 1908.

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The following columns are intended for the convenience of all readers for discussions upon blacksmithing, horseshoeing, carriage building and allied topics. Questions, answers and comments are solicited and are always acceptable. Names omitted and addresses supplied upon request.

Wants to Drill Chilled Metal.—Will some member of the craft tell me how to take the temper out of chilled metal so that it can be drilled? E. W. J., Kentucky.

Regarding Gas Engine Power.—We are thinking of putting power in our shop, and would like to know if any brother craftsmen are using the "New-Way Air-Cooled Gasoline Engine." What success are you having? An early reply in these columns will be much appreciated. J. J. ROBLIN.

Erratum.—In the April number and in the footnote on page 153 we said that Mr. Franz Wenke, the writer of the article "Another Pathological Shoe," was "Veterinary Surgeon in the United States Army." This should have read "Veterinary Sergeant." THE EDITOR.

How do you Brown Rifle Barrels?—I would like to know if some brother smith would kindly give me through the columns of THE AMERICAN BLACKSMITH a good recipe for browning rifle barrels and parts. I am now using a method, but it is not satisfactory. J. WOYCICH, S. Africa.

Wants to Harden Plowshares and Cultivator Shovels.—I would like to hear from some brother smith on the hardening of plowshares and cultivator shovels. What is the best method of doing this work? Would like some brother to answer in the next issue. DANIEL JONES, Illinois.

A Roller Disk Sharpener.—Will some brother smith tell me who manufactures a machine that rolls the edge of disks cold when sharpening them? I am informed that one of this kind is manufactured and should like to know the name of the firm that makes this machine, also where they are located. J. B. HALL, Washington.

To Help is your Duty.—The article in the February number by Richard O'Hearn is worth untold wealth. I should like to shake his hand, and I hope we will hear more from him. Our trade is a noble one, and I feel like hiding my face when I think of how the trade is handled. It is the fault of the men working at it. Your paper is what we want. JAMES ORR.

A Foundered Horse and Glue.—What is the best treatment to be given a foundered horse that has been neglected some time? All four feet are being disfigured, and the mobility of its front feet is much hindered. What manner of shoe should be used?

Will someone please give me a recipe for making liquid glue for setting spokes? HENRY NOTESTINE, Ohio.

This is an Exception.—I do occasionally differ with some writers as to the best way to get on in the business of running a shop successfully. I do not advise anyone to stay where it is a necessity to have a side-line. It is a poor location that will not furnish plenty of business. I have been in my present location 31 years, and there's no elaborate sign over my door, not even my name. WM. L. HINMAN.

How to Lay Corn-Planter Shoes.—Illustration at A is the shape of a new shoe when it comes from the factory. It wears off to notch and then looks like B in the illustration. To repair them I take a piece of crucible steel like C. On the under side of the runner XX, where it is worn out, I make a very short scarf. I now take heat on point of piece and weld. I then finish at heel, grind, and polish, and the farmer has a runner on his old planter that will look like new. G. L. GUYER, South Dakota.

Another Example of Association Activity.—"Notice is hereby given that at a general meeting of the undersigned association, it was decided to advance prices on shoeing and general blacksmithing and wagon work in accordance to the prices adopted by the said association. Prices to take effect May 15, 1907. Signed,

THE KEWANEE AND DOAR COUNTIES BLACKSMITH AND WHEELWRIGHT ASSOCIATION."

This affects prices within a radius of 30 miles, and every blacksmith is with us. HERMAN MOLLE, Wisconsin.

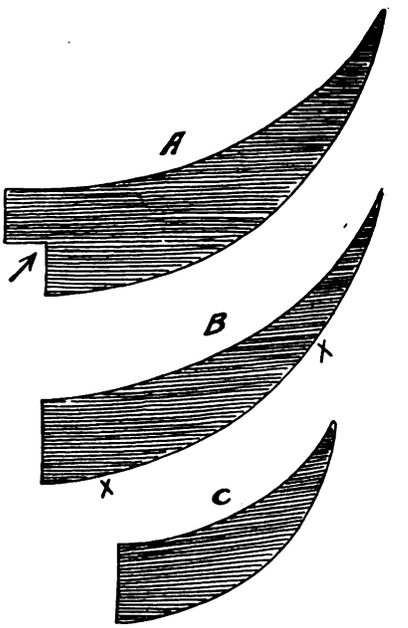
From the Pacific Coast.—I have all the work that four men can do. One year ago this month I took in a machinist as a partner. We employ two men steadily, and I take a hand in the shop just the same as if I were employed there and so does Mr. Redmond. Besides the shop work I attend to all the business, answer correspondence, keep the books, make out bills, and do all the buying. We have a new shop fully equipped with machinery, and do from $800 to $1,000 worth of work each month. PERCY FOSTER, California.

A Few Prices from Texas.—I have been a constant reader of THE AMERICAN BLACKSMITH, which I consider one of the best blacksmith journals published, for five years. I live in the southwest corner of Bastrop County and have a very nice custom or patronage. I have three forges, a House cold tire setter, a drill, a Little Giant punch and shear, besides many other tools. My prices for work are as follows:

Horseshoeing, 4 shoes	$1.00
Resetting	.60
Sharpening plows	$.15 to .30
Pointing plows	$.50 to 1.25
Wagon tongues, put in	3.25
Wagon axles	3.50
Buggy shafts	3.50

Other work in proportion. My shop is 20 by 50 feet. W. A. TURNER.

A Letter from the Pacific Coast.—The book is of great service to me by way of new methods of work in my line, and the other information it contains. Forty-seven years ago I entered my apprenticeship and have used hammer and tongs ever since except about three years. I shod horses for Uncle Sam, and have shod most all kinds of feet, and must say a foot on the horse and a foot on a paper are different propositions. But I use just as much of the rules laid down as will apply to the job in hand. I seldom have to change a shoe until it has been on long enough to need a new one, and am shoeing some horses for many years. Have been in this same shop since 1882. J. R. BOGGS.



HOW TO LAY CORN-PLANTER SHOES

A Talk on Tire Welding.—Mr. Thos. H. Long asks a question referring to welding tires in which he seeks to find out how to keep the under lap from burning. I will give him the old Nevada style. Most all tires we have here are four, five or six by one-inch tires and from five to six feet and a half high. We have a crane for handling them, which is the most useful contrivance in the shop. I first build up a pretty fair fire and then scarf my tire and get both laps fitted snugly to each other. I always punch a hole in each lap and put in a ¾-inch rivet which keeps the tire from springing apart, and also allows you to get the laps snugly together, which is very important. Then I clean out my fire good and put two pieces of iron each side of the fire to keep the tire from dropping to the bottom and also to keep a fire of at least seven or eight inches deep and about six inches long. Now I put in my tire and pile the coke over it, so as to have a covering of five inches of coke, and then pile on top of that about four inches of green coal—don't spare the coal. After blowing lightly you can poke away in front a little so as to be able to see the heat. But do not disturb the top part of the oven, for the secret of getting a uniform heat is to keep all air from touching the heat. When your heat is what you want, take out the tire and get busy. Care must be taken to have the fire short, as you are very likely to burn out on each side of the laps. I weld five and six-inch tires this way and very seldom have to take more than two heats. W. M. KIRBY.

Ringbone and Spavin.—Can any readers of THE AMERICAN BLACKSMITH give me information through these columns of

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what will cure ringbone and spavins? I have a beautiful mare with ringbone or sidebone on both hind feet and spavin coming on both legs. Is there any sure way to get them off without trading them off? Has any one tried the cure called "Spavin Off"? If so, did it work successfully? I have shod horses for some 30 years but have never before seen an unbroken colt having two ringbones and two spavins. E. F. BREITENSTEIN, Washington.

A Letter from Manitoba.—We do feed crushing as a side line, and also have the agency for gasoline engines. We use a 14 H. P. engine for our work and use power machines for nearly every job that can be done that way. We repair everything that comes our way. I came here from N. D. three years ago and bought a shop. It was at that time a Tom Tardy outfit, and you had to get out if it rained. The tools were no good, so I sold them back to the man for $35.00. I've since rebuilt and now have $2000 worth of stock, tools, and machines. S. A. BELL, Northwest Ter.

How to Lay Planter Shoes.—Get a piece of plow steel, 4½ by ¼ inches. After removing the old runner, cut a strip from your plow steel just the size of the old runner, and also one about four inches, or long enough for the V. Sharpen both edges the same as for a plow, and lay them together so that one end of the short piece, being scarfed, will rest on the solid bar. Weld the solid end to form V, and proceed to sharpen all the way up, being careful to bend it edgewise the same as the old runner. Now open the V and fix it to the shoe on the drill. Now mark and drill hole for rivet. Be sure to get front end right. A. PRIMMER, Missouri.

Repairing Wagon Wheels.—I have seen a good many ways to repair wagon wheels that have too much dish, but none have yet come up to my mind as being correct. I draw the spoke and shave the front side of the tenon that goes into the hub. Then I make a wedge as wide as the mortise and put the thick end down in the mortise in the hub and on the back side and drive my spoke by the gauge so my wheel is as straight as a new wheel. I have found this rule to work well. I don't want a spoke split by any means, for that only causes the tenon to become weak. I think that this is plain, but I have never seen anyone do the job this way. JOSEPH TULL.

A Few Prices from Louisiana.—My shop for wood-work is 18 by 36, with a part 16 by 32 for blacksmithing. Four years ago I put up a small shop with a few tools and very little experience. There was only one shop in town, when I came here. I had fine success, and in two years bought out my competitor. Now I own a good shop with a very good lot of tools and have a partner, and we get all the work we can do. We get $3.00 for axles, $3.00 for spoking a wheel, $3.00 for rimming a wheel, $2.50 for wagon tongue, $1.00 each for tongue hounds, $1.00 each for buggy reaches, $2.00 for shrinking a set of tires, $1.30 for shoeing. G. W. EDWARDS.

On the Repair of Sarven Wheels.—Just tell the brothers that I have long ago given up the practice of removing the rivets from the hub when filling a Sarven wheel. All I want is a good dry spoke and some good glue to make a good wheel, and by using a light hammer and tapping the flange apart a little where the rivet drew it together, I will guarantee to drive the spoke tighter than anyone can rivet it. The main thing is to use spokes that are bone-dry. No man can build a good wheel with a spoke that is not dry, no matter how he goes at it. I



J. W. KOSAK, A YOUNG SMITH OF SOUTH DAKOTA

never have any trouble with them, as I always carry spokes in stock from six months to a year so as to make sure they are dry. A. H. WICKLER.

A Gas Engine Query.—When I started in the blacksmith business I knew absolutely nothing about it, and, besides, had no one to teach me. In spite of this, however, I am now a successful smith. Five years ago I came to this place and have now built up a nice trade. My shop is well furnished and considered the best one here. My dwelling is located about fifty feet from my shop, and about the same distance on the other side I own a livery stable.

I am thinking of putting in a gasoline engine in my shop, and I would be glad to know which kind is the safest and the best. Could you tell me what kind of a turning lathe will pay me best, and what horse power will be required for a lathe band saw, emery stand, cut-off saw, and grindstone? J. B. BICKLEY, Louisiana.

A Letter and a Few Prices.—In this, my first attempt to write you, I wish to say that I get more good out of your paper than anything else I have ever read. Two years ago I started in business for myself, and now possess a shop 28 by 36, have two fires



BROTHER KOSAK'S GENERAL SMITH SHOP

and keep a man during the entire year to assist me in all kinds of work that is to be done in a country shop. About three miles from here there are two other smiths, and as this is a good farming country, we are kept busy constantly. We receive good prices for our work. Here are some of them:

Four New Shoes, handmade	$2.00
Four New Shoes, machine make	1.40
Four Shoes set	.60
Four New Neverslip Shoes	2.50
Wagon Tongues, New	1.50
Tire Setting, Buggy	2.00
Tire Setting, Wagon, 3–3½	2.50
Tire Setting 1½, 2,	2.00

All other small jobs are at about the same rate. PETER DE BROWN, Michigan.

Appreciation and a Question.—I am a reader of THE AMERICAN BLACKSMITH, have been for some time, and think a great deal of the journal. I think it is a great help to the mechanical profession, and I get some very good ideas from it. I am amused sometimes at different questions and answers, but of course that is the way to get information. Get the different opinions on different kinds of work, get the ideas of different craftsmen and try them and see if they are better or as good as your way. That, I think, is a good way to advance in skill and workmanship. I see the blacksmiths are organizing all over the country. That, I think, is the best thing the craft can do. I have been a wood-worker for almost thirty years. I will ask a question, maybe some brother blacksmith can answer it. How did the first blacksmith make his first hammer? What's your answer? D. W. HENDRICKS.

Twenty-six Years' Experience and Still Learning.—Please find enclosed order for $2.50 for subscription. I don't know when the time is out, but I don't want it to stop, for I think it is the best paper out. I don't see how you can print it for the price that you ask. I deal with some of the firms in the paper and find them all right. Have got all of my papers since I started and every once in a while I look them over for information. I have worked for twenty-six years, and am learning all the time. There are so many things I read of that I wonder I never thought of them myself. I take several papers in my business, but the others will have to go some and some more if they want to get ahead of THE AMERICAN BLACKSMITH.

One thing I would like to see, and that is a lien law here in Montana. I think the smith is entitled to his money. He don't get his supplies for nothing and has to work hard too. P. J. MORSE, Montana.

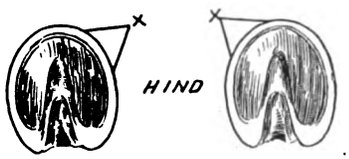
Wants to Solder Lead Pipe.—I have followed the trade for 30 years and find your paper the most practical of all I take for the trade. In my ten years service for the United States, I have had charge of several different shops and have gained much experience, but I often find new kinks and many a hint from some old timer in your paper that will help me out. In the Indian Service, we have all kinds of repairing from a coffee-mill to an automobile. You will be surprised when I tell you some Indians on the Reservation own hay presses, steam threshers, and automobiles, and some fine horses. I have four Indian apprentice boys, and we have all the water system, plumbing, etc., to look after, steam laundry and water pipes, horseshoeing, wagon repairing, and all farm implements, and it keeps us busy. I would like to hear some brother give us some points on soldering lead pipe and brazing. We have some trouble in mending them, especially the wash sink traps, etc. I will tell about a new process I have for chilling and plating iron and soft steel,

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brass or copper finish if someone wants it. It may possibly be of help to some brother smith. C. W. PHELPS.

Handling Dead Beats.—In order to handle "dead beats," a blacksmith must do his work well, for they will break you up in business if you but half do it. If, however, you treat them politely, they will tell everybody what good work you do, and will thereby increase your trade. There is always some little work on hand that needs attention, such as plowing, hauling, etc. Ask the "dead beat" to do it for





A TROTTER THAT INTERFERES

you, and if you give them a kind word besides, they will be pleased to obey orders. Charge all alike. Do not try to do too much work, and do it all well. Get acquainted with all those you do not know. Have your shop clean and your tools in a tidy place and always ready for the next job. Keep your books correct and neat. Always look pleasant, be accomodating and helpful to those that do not like your ways, and you will not regret it. This has been my experience for fifty years, and I have always found it worked very satisfactorily. A. S. PRIMMER, Maine.

A Few Prices from Arkansas.—I will write a few lines to your paper for the first time. I am located in a small railroad town. My shop is 48 by 60 feet. My machines are operated with a 6 H. P. Weber Gasoline Engine. I have a bandsaw, a turning lathe, a hand and power drill, a universal tenoning and boring machine, one 24-inch rip saw, one 24-inch cut-off saw, and an emery stand. I have en route one 18-inch Crescent jointer. I want some brother smith to tell me where I can get a trip hammer that will successfully sharpen plows. I will give you a few of my prices:

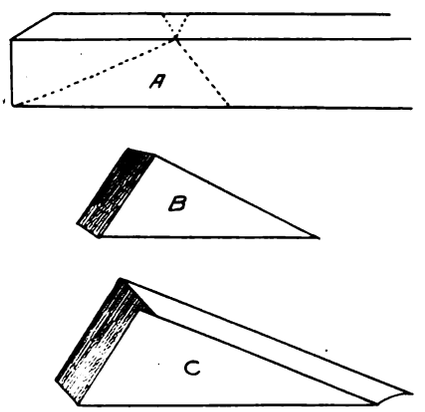
Shoes toed	$1.20
Plain	1.00
Plow sharp	.10
Wheel filled	$3.50 to 5.00
Wagon tongue	2.00
Wagon axle	2.50 to 3.00
Wagon singletrees	.75
Doubletrees with thill	1.25
Doubletrees without thill	.75
Neck yokes	.75

Everything else is priced in the same proportion. W. B. HOLBROOK, Arkansas.

An Interfering Trotter.—I want to know how to shoe a trotter that strikes the outside of her front shoes with the inside of the hind ones. The diagram shows just how this animal strikes. The points of contact are marked X. Can some practical shoer tell me? NAT. DOHERTY, Nova Scotia.

To Weld Wagon Tires.—In answer to Brother T. H. Long's inquiry on how to weld wagon tires would say that I measure my tire and cut lap to a thin edge. Then cut a lip as at A about an inch or inch and quarter from end according to the thickness of tire. Give tire plenty of spring inwards so that it presses tight against the lip, and it is then ready for welding. The lip does away with the old way of putting a rivet through. Place the back edge of the tire in the fire, and bring to a weld, allowing time to get hot through and through. Weld half of it at a time, then turn around and place tire face edge down in fire, heat and weld and smooth with flatter. Some brothers may say that the tire will only be welded on each edge. This is not so, for with a little soaking I can get a four-inch tire welding-hot right across, and heat edgeways in the fire. R. BARNES, England.

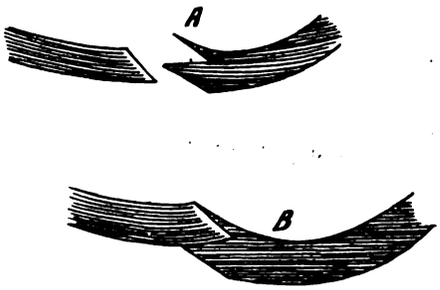
A Letter from South Texas.—We have very good prices here. We get $1.50 for four plain shoes and $3.00 for tire setting. Other work is in proportion. In a recent issue I noticed a plan from A. W. Short on making a plowshare, which is very good, but it is hard to understand just how he intends for the work to be laid out. It's easy after you see it as A in the engraving. This shows his plan of marking out share landside. The piece B is cut out and has the slope the reverse of the slope of the share. Then this slope is worked over as in C, after which it is ready to weld up to share. But I think that I know this fellow. It must be S. W. Short, as it is his way of making shares. I notice some one wants to know how to make an emery stand. There have been several plans given in THE AMERICAN BLACKSMITH, but it's best to buy one from the dealer, as they are very cheap. You can buy a stand large enough to run 2 by 2 by 12-inch wheels



HOW TO MAKE A PLOWSHARE

for about $14.00. Then you have something that will last and give good satisfaction. W. A. SHORT, Texas.

A Question on Shoeing a Trotter.—I have worked fifteen years at the trade. Have done repairing of all kinds on vehicles, and have shod draft, driving, and race horses. But I have found that in shoeing horses there is something to learn all of the time. My style of removing an old calk from an old shoe is to heat the calk to a good heat and take my large pincers and pull it off, which is done very easily. You will have a neater job than to weld a new calk over the old one. My experience tells me that in shoeing light or driving horses, it doesn't make so much difference as to the shape of the shoe as it does to getting the hoof in a level condition, or in other words in a natural condition. I have at present a trotting mare that hits herself the queerest of any I have ever seen. If any of the horseshoers who read "Our paper" can unfold the secret of shoeing her, I would like to hear from them. The animal spreads very wide behind, but she hits or strikes her cannon bones very badly on both hind legs half-way between the ankle and hock joints. She seems to do it with



HOW AN ENGLISH SMITH WELDS HEAVY WAGON TIRES

the outside calk of her front shoe. In picking up her front feet, she gives them an outward twist in such a shape as to hit herself. She is standard bred and a valuable animal. A. C. BARR.

A Few Questions.—I wish to add my name to your already large list in praise of the benefits which "Our Journal" has brought to myself and the craft generally. Each month brings numerous new methods and ideas. I feel sure I could not feel comfortable unless I knew that each succeeding number was already on the water. Your mode of shoeing is far different from ours, inasmuch as you use all calks where we use none. These is no ice or snow here, and in the northern part of the state, where I live, there are no hills, hence the country is very level and shoes are all plain.

I would like to have some brother smith give some methods of shoeing, cross-firing and striking (both front and back feet), to suit this particular country. Also will some practical smith give me ideas on welding buggy and cart steel axles, square beds (long), as I have great difficulty in welding some of them. I can manage the 1¼ and 1½ sizes all right, but the 1¾ and 2-inch at same heat will neither stick nor weld, and if I put on a trifle more heat it is worse. In fact, I have tried them at all heats, but cannot weld them to my satisfaction in one heat. Neither can I do it by using iron on one end. Perhaps some brother smith can assist me. I use a coal fire, but it is well coked before taking a heat. S. LANG, Australia.

As Useful as the Anvil.—I have been a constant reader of "Our Journal" for the past three years, and always look for a better paper each succeeding issue. It is

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unnecessary to say that I am never disappointed. I think "Our Journal" has just about reached the climax of perfection in literature for those interested in the trade. I have gotten so much information through its columns that I regard it to be as useful as the "anvil on the block." The articles on shoeing written by our esteemed brothers Perrin, Metcalf, and others contain good, practical "foot sense," such as anyone can understand.

I have been shoeing horses for twelve years and must say that in the last three years that I have been a subscriber to "Our Journal," I have gleaned from its columns more good, solid, practical ideas on horseshoeing than from any other journal I have taken. I have also learned a good many hints on running a business from that sound, practical business head of Brother Thornton. Although I am going to discontinue the horseshoers' trade and accept a position with The Ausable Horsenail Co., I want the journal to come right along just the same. It will always be a benefit to me or anyone who is interested in the better welfare and progress of the trade. HARRY SMITH, Texas.

Wants to Forge a Two-Way Shaft.—The accompanying illustration shows a two-way crank shaft. I would like to know how to make one and what method is used to get the throw on the quarter. Can some brother give me the necessary information? E. O. WINKLER, Pennsylvania.

Two Special Shapes.—Can some reader tell me how to make an iron shaped like the figure at A, so it won't break in forging at the shoulder where the arrow points? I would also like to know how to forge the piece shown at B. This piece is to brace the hounds in a truck; the springs fit in at X and Y. THOS. H. LONG, New York.

A Few Indiana Prices.—I have been reading your valuable journal for over three years. I find many helpful articles in its columns, and think there cannot be too much done to help the craft. I have worked at the business for over ten years, and don't know it all yet.

I have settled in a good country and get my share of the trade. It seems, though, that my near brothers are afraid to put the price where it should be. I think we deserve more for our work.

Our towns range from six to eight miles apart, and we could have just a fine line of prices if the boys would only say so and stay by the craft. I have steam power now, and do all kinds of work such as country shops do, but will soon put in a gasoline engine. I would like for some reader to advise me as to the best make of engine for a small shop. Our prices are as follows:

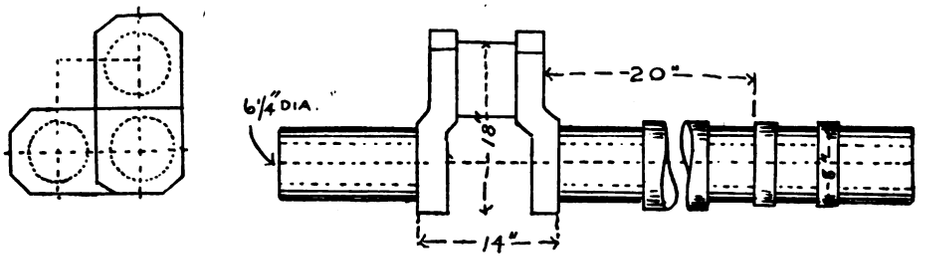
Four New Pressed Shoes	$1.25 to $1.50
Four Hand-Turned Shoes	2.00
Four Tires Set	2.00
Four Buggy Tires Set	1.50
Four New Wagon Tires 3 in. by ½ in.	10.00
Four New Buggy Tires	4.00
Wagon Axle	3.00
Wagon Tongue only	2.00
Plow Shoes Ground each	.15
Steel Lay Shape	.20
Road Scraper Blades Sharpened	2.50

Other prices are in proportion. I hope that we will soon be able to get together and make better prices, as I know we don't get enough. WILL H. LIHMAN, Indiana.

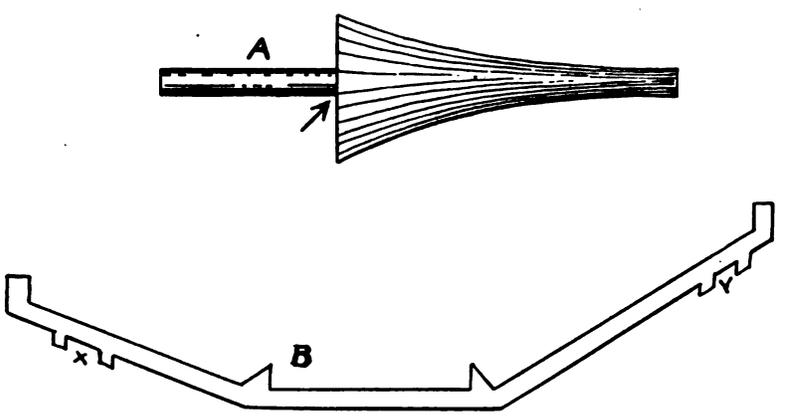
A Charter Member of A. B. Family.—I have been a reader of "Our Journal" since it started and have found considerable good reading and information, often worth more than the paper cost.

I have a blacksmith shop run by water power, which I think is the best power there is for this kind of work; it is always ready and as mine is a light power, it is not very expensive. I have a power drill, an emery stand with two wheels, a bolt cutter, a band saw, a bench saw, a board planer, a buzz planer or jointer, two turning lathes, an emery belt, an irregular planer and a hub boring machine, so that I am machinery poor. These are some of our prices:

New Shoes, light	$1.25
New Shoes, heavy	1.50
Toe and set	.80
Reset	.60
Buggy Tires reset	2.00
Wagon Tires according to heft	from 2.00 to 4.00
Setting Axles, light	.75
Mending shaft irons	.50
Putting on new light tires	4.50
New Stubs, light	6.00
Woodwork—spokes, singly	.25
Woodwork—spokes for more than one	.20
Rims, light	$1.25
Poles for two-horse wagon	$2.00 to 2.50
Shaft for one-horse wagon	1.25



THE MAKING OF A CRANK SHAFT WITH TWO THROWS PUZZLES A PENNSYLVANIA SMITH



TWO SPECIAL SHAPES THAT CONTAIN OBSTACLES

New Buggy Shafts	1.50
New Buggy Shafts, without leather	$1.75 to 2.00
Reach or Coupling Pole	1.50 to 1.75

Other prices are about the same proportion. C. O. COOK, Massachusetts.

PRICE LIST.

OF THE HORSESHOERS' ASSOCIATION OF BIDDEFORD AND SACO, MAINE.

Four new shoes, sizes 0, 1, 2, 3, 4	$1.25
Four new shoes, sizes 5, 6	1.50
Four new shoes, size 7	1.75
Four new shoes, size 8	2.00
Bar shoes, plain, per pair, sizes 0, 1, 2, 3, 4	1.00
Bar shoes, calk, per pair, sizes 0, 1, 2, 3, 4	1.25
Bar shoes, calk, per pair, sizes 5, 6, 7	1.50
Bar shoes, calk, per pair, size 8	2.00
Hand turned, per set	$1.50 and 2.00
Resetting.	
Four shoes, sizes 0, 1, 2, 3, 4	$ .75
Four shoes, size 5	.80
Four shoes, size 6	.90
Four shoes, size 7, 8	1.00
Two New and Two Set.	
Sizes 0, 1, 2, 3, 4	$1.00
Size 5	1.15
Size 6	1.25
Size 7	1.50
Feet Dressed with Leather Tar and Oakum.	
Sizes 0, 1, 2, 3, 4	$ .35
Sizes 5, 6.	.50
Rubber Pads.	
Sizes 1, 2, 3, 4	$2.00
Size 5	2.50
Size 6	3.00
Shoes with two quarter calks and toe calk per pair	.75
Extra calk for hard wearing horses outside, each	.05
Never Slip.	
Sizes 0, 1, 2, 3, 4, per set	$2.00
Size 5, per set	2.50
Size 6, per set	3.00
Size 7, per set	3.50
Extra calks, each	.05

Prices to be governed by size of front shoes. Any customer furnishing his own shoes shall pay the price of new shoeing.

Why are Prices so Low?—Some say it is because the smiths fight one another and cut prices. Others say it is because when material goes up, the smith will not put up his price likewise. I do not see it that way. In my eight years of blacksmithing experience, I find that the low prices come from the poor smith who is not a good enough workman to demand higher ones. I do not say that all of the smiths are poor workmen, but there are a lot of them who are not fit to be at the

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forge at all. These are the fellows who will not take a trade journal, nor try to learn anything, for they think they know it all. You simply cannot tell them anything. If the smith will only spend a dollar or two to better himself by taking a course at some school of correspondence, or by procuring papers that tell about the trade, it won't take long before he can demand higher wages. Start an association and ask your brother smiths to raise prices with you. They won't refuse. Be on the lookout, though, for the best workmen are liable to rob you of your trade, so prepare yourself accordingly.

Here are some of our prices:

Four New Shoes	$1.50 to $1.80
Shoeing (old shoes), each	.25
Bar Shoes, each	.50
Hand-Turned Shoes, each	1.00
Axles, front or hind	3.50
Bolsters, front or hind	2.50
New Stakes, old irons	.50
Tongue hounds, each	.75
Hind hounds	1.25
Wagon Tongue	3.25
Neck Yoke, old irons	.50
Sharpening Plows	$ .25 to .35
Painting	1.00
New Plow Lays	$3.00 to 4.00
Pointing Listers	1.25
Plow or Lister Handles, each	.75
Buggy Spokes	.25
Half Rim	.75
Full Rim Wheel	1.50
Set four Buggy Tires	2.50
Set four Wagon Tires	2.00
Cutting down Wagon	10.00
New Buggy Pole	3.25
Tongue complete	6.50

Other prices about the same.

S. B. PEMBERTON, Kansas.

About Published Price Lists.—For quite a while I have kept silent and listened to the other fellows through your valuable paper, but lately I have come across something that causes me to say these few words

I notice that you are printing quite a large number of price lists from various localities that readers of your paper send in. These you print on request, which is probably all right as far as you are concerned, but to my way of thinking it is a detriment to the craft. There are so many unscrupulous people who have no right to know these prices, and before you know it the catalogue house gets in its work and gets your business away from you right under your nose. Price lists should be placed in the hands of the legitimate trade only, and should be printed in booklet form. They should be referred to by us in the same manner as the wholesaler refers to his list and then figures his discount.

When goods go up, do we raise our prices to comply with the increased cost of material? I have never been able to do it because my competitor would not agree to.

Lately I have received from the jobbers, with whom I do business, a price list printed in booklet form which is a very fair one, and if corrected a trifle would be very effective because it would not be in the hands of farmers and people that have no right to know of these things.

Kindly give your readers my views on this subject, and urge upon all men working at the craft to stay by the prices that are being sent out by jobbers as much as possible and not send any more lists to the trade journals for publication. If they do this I have no doubt but that we will be able to keep an equal basis with the wholesaler. If you look over the prices of the heavy hardware jobbers throughout the country, you will find that the difference in their prices is in freight relative to their distance from you.



A PAUSE FOR THE MAN WITH THE CAMERA IN A CITY SHOP

I would like a general discussion on this subject.—A. J. YEAGER, South Dakota.

Editor's Note.—We should also like a general discussion on this subject of publishing price lists. We have our ideas on the matter, of course, but will leave the matter entirely to our readers for settlement. Shall we continue to publish retail price lists or not?

Wanted: A Good General Smith.—It seems to me that there is a good opening in this town for some good, competent blacksmith and wheelwright that for some reason or other might want to locate in the healthy climate of the sunny Southwest. Some one, for instance, that has a wife or some other member of his family who is threatened with consumption, or even the smith himself might feel as if he'd be willing to get away from the strenuous life of the busy East and come out here where we have the finest climate in the world, and where there is a chance to grow up with the country.

San Rafael is 95 miles west of Albuquerque and 3¼ miles from the coast line of the Santa Fé R. R. The town is almost entirely Mexican, although there is getting to be quite a sprinkling of American settlers. From the looks of things, it can't be much longer till folks begin to find out what a first-class country this is, and will begin to crowd in to settle it up.

There is no real blacksmith for 50 miles around, although a Mexican was located here for the past four years who had a well-equipped shop which was fitted up for him by one of the American merchants who did everything possible to get him to attend to business in a decent way. The aborigine didn't make good, however, although personally he was a very likable sort of chap, but he has had no chance to really learn the trade, and has merely picked up a little information here and there. Besides this, he was pretty fond of strong drink, and would take a drink or two early in the morning. Then for the rest of the day he would put in about one part work and 49 parts talk, and so didn't get ahead very fast. He always had work piled up for weeks ahead, and when the merchant who had been helping him along finally went out of business, lots of folks had to go to the shop and take home work that had been in the shop for weeks and even months.

The work is about the same as that done in any other country shop, only there is hardly any shoeing. It is mostly wagon and light vehicle repairing, some mowing machine work and a few hay presses. Prices are fair, comparing favorably with lists I've seen published in THE AMERICAN BLACKSMITH. Cost of living isn't excessive, and there is a Mission School and also a Public School here, besides a Catholic church and several good stores. There's still some mighty good Government land open here yet, and there's no reason why a man willing to stick to business and work and do right, couldn't build up a good business and be independent in the course of time.

There are no strikes, no lockouts, no water rent, no gas bills, not one of the myriad troubles that beset the path of the poor workingman or mechanic in the large cities and in the thickly settled districts of the older states. Of course it would be an advantage if a man coming here could speak Spanish, but at the same time it isn't strictly necessary, because pretty nearly all of the younger generation speak English, and there is always some one to interpret upon occasion.

We haven't any outlaws or savage Indians to disturb the peace and dignity of the communtiy. The Mexicans are good neighbors and ready to treat an American right if he will treat them that way. Lots of our fellow countrymen coming to this country make the mistake of looking down on the natives and treating them in a way that would ruffle up the feelings of a yellow dog. Strange to say, the Mexicans feel it, and are pretty apt to retaliate, not with the proverbial knife in the back, because they are fully as law-abiding as Americans, but simply by letting the offending party severely alone. And as we are all here for the cash there is in it, and have to depend on the trade we can get to bring the dollar, why, of course, being ostracised is disastrous.

As far as honesty and readiness to pay is concerned, I will simply say that I've been located here practicing medicine for the last four years, haven't kept any book except a cash book, and have done a very comfortable business amounting to several thousand dollars, and a hundred dollars would more than cover all my loss through bad pay.

If the Editor knows of any one that this might appeal to or if he sees fit to give the gist of this letter some little odd space in THE AMERICAN BLACKSMITH, I will take pleasure in replying to all inquiries for further details. It's a fair location right now, and I'd almost guarantee that inside of a year a man could work up trade enough to keep himself and a helper busy ten hours a day or even more. —CHARLES M. GROVER, San Rafael, Valencia Co., New Mexico.

Editor's Note.—The foregoing appears like a very good "tip" for some enterprising general smith. Those readers who would be interested in locating in New Mexico will do well to write Dr. Grover concerning full details of the locality.

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Packed regularly one dozen of a size in lock corner wood boxes, also sold in sets of seven and nine drills of popular sizes. They are made of the best of material, tempered just right for the purpose.

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THE QUALITY OF VULCAN HORSE NAILS IS FULLY GUARANTEED.

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SEYMOUR, CONN.
SOLE MANUFACTURERS.

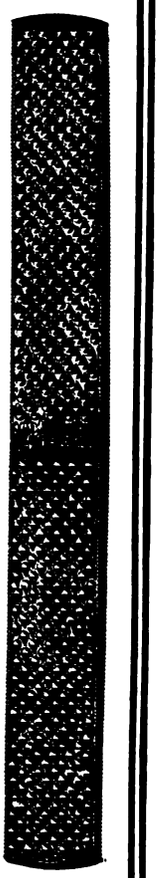
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are made from tough, durable, lively New Rubber. Quality is the first consideration. Our "Wing" Tire will outwear several ordinary rubber tires. The wings (see cut) keep water, sand and grit from working between the channel and the tire, to wear out the tire from underneath, Write for particulars.

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Best High-grade Steel.
Hard, Thorough Temper. Sharp Cutting Edge.
Sharp, Strong Teeth, Well Backed.

Every Rasp Perfect and Warranted

Made in all regular sizes, and in the new 18 inch Slim, which gives the user the advantage of a long stroke, and at the same time a rasp of medium weight.

ASK YOUR DEALER FOR THEM

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Prices Current — Blacksmith Supplies.

The following quotations are from dealers' stock, Buffalo, N. Y., July 1, 1907, and are subject to change. No changes have taken place since last month's quotations.

All prices, except on the bolts, are per hundred pounds. On bars and flats prices are in bundle lots.

Bars—Common Iron and Soft Steel.

¼ in..	round or square;	Iron,	$2.95	Steel,	$2.95
⅝ in.,	"	"	2.55	"	2.40
½ in.,	"	"	2.35	"	2.20

Flats—Bar and Band.

¼	x 1 in.,	Iron	$2.40;	Steel	$2.40
⅛	x 1½ in.,	"	2.80;	"	2.80
3-16	x 1½ in.,	"	2.50;	"	2.50

Norway and Swedish Iron.

¼ in., round or square	$4.90
⅝ in., " "	4.50
½ in., " "	4.30
⅛ x 1 in	4.80
¼ x 1½ in	4.20

Horseshoe Iron.

For No. 1 shoe, ⅜ x ¼ in	$2.50
For No. 2 shoe, ⅛ x ⅝ in	2.50
For No. 3 shoe, ⅛ x ⅜ in	2.50
For No. 4 shoe, ⅛ x ⅛ in	2.50

Toe Calk Steel.

½ x ⅝ in. and larger $3.00

Carriage Bolts. (Net Price per Hundred).

¼	x 2 in	$0.54	⅝x2½	in	$0.82
⅛	x 2½in	.58	½x3½	in	.96
¼	x in	.62	⅝x6	in	1.81
5-16	x 2 in	.65	½x4	in	1.70
5-16	x 3 in	.75	½x6	in	2.10

Spring Steel.

⅝ to 1¼ in. Rounds. Op. Hearth $3.00, Crucible $5.00
1¼ to 6 in. by No. 4 gauge to ½ in. Flats " 3.00, " 5.00

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Blacksmith and Wagon Makers' Supplies,

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THE BARLOW HARDWARE COMPANY
CORRY, PA.
Carry a Complete Line of Horseshoers' Supplies, Wagon and Carriage Material.
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Carry complete line of Horseshoers' Supplies, Wagon and Carriage Material.
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Write us your requirements.

THE
Williams Hardware Co.
Minneapolis, Minn.
Wholesale IRON, STEEL and HEAVY HARDWARE.
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HORSESHOERS' SUPPLIES.
Send us a Sample Order.

WANTED AND FOR SALE.

Want and for sale advertisements, situations and help wanted, twenty-five cents a line. Send cash with order. No charge less than fifty cents

FOR SALE—Best blacksmithing business in northwest Texas. **Lacewell & Smith, Claude, Texas.**

WANTED—Young man to finish learning or learn trade. **A. GAUVAIN, Minatare, Neb.**

WANTED—A good, reliable, all round blacksmith. Must be a good horseshoer. Address **N. N. HARRISON, Lake Co., Perry, Ohio.**

WANTED—One thoroughly competent carriage blacksmith and one carriage wood-worker. **Muncie Wheel and Jobbing Co., Muncie, Ind.**

FOR SALE—Will sell a good spoke and handle lathe cheap or exchange for a band saw. **J. J. DEWALT & SON, Oakville, Pa.**

WANTED—Ambitious men to act as agents for our fine line of calipers, etc. Address **E. G. SMITH CO., Columbia, Pa.**

WANTED—Agents to handle a line of Taps and Trimmings and up to date specialties. **BUOB & SCHEU, Cincinnati, Ohio.**

FOR SALE—Blacksmith shop. Write at once. Don't buy until you hear from me. **Box 132, Dardanelle, Ark.**

WANTED—Experienced rubber pad salesman acquainted with and capable of selling large buyers. Address **F. C. B., care American Blacksmith, Buffalo.**

FOR SALE—Any blacksmith send $1 and I will tell you how to make a cement at a cost of five cents to put on wagon skeins that is waterproof and holds the skein tight. **R. E. DEWALT, Oakville, Pa.**

FOR SALE—A fine power blacksmith and machine shop with two lots on main street. Good trade for two men the year around. For terms and prices write **PAUL GORDER, Frederick, S. D.**

FOR SALE—One Kerrihard power hammer No. 1. This hammer has never been used. Best cash offer takes it at Basin, Big Horn Co., Wyo. Address all letters to **L. B. 557, Winterset, Iowa.**

WANTED—Salesmen for Extension Axle Nuts. Sure cure for wabbly buggy wheels. Exclusive territory. Big commission. Special introductory offer. **HARDWARE CO., Box Z 10, Pontiac, Mich.**

FOR SALE—Complete set 4 to 25 H. P. gas engine drawings, patterns and patents. Patterns in Providence, R. I. **Hadwen Swain Mfg. Co., San Francisco, Cal.**

FOR SALE—Light manufacturing goods. Introduced. Protected by patents. Sells to blacksmiths and hardware trade. **E. C. SPRINGER & CO., Mason City, Iowa.**

WANTED—Traveling men who visit the carriage, implement and livery trade make big commissions, selling our steel and rubber-tired wheels, as a side line. Why don't you try it? **THE BOOB WHEEL CO., Cincinnati, O.**

FOR SALE—Butts & Ordway "Easy" punch. Punches three-sixteenths, one-fourth, five-sixteenth and three-eighths without change. In perfect condition. Cost $30.00, will sell for $20.00. **JOHN McNEIL, Centralia, Ill.**

FOR SALE—At a bargain, Blacksmith and wagon shop, 32x42 feet. Two stories, new 9 room house and out buildings. One acre of land with all kinds of fruit. Only running shop in five miles. Good prices and lots of work. Good reasons for selling. Write **G. G. EMRICH, Upper Lisle, N. Y.**

WE BRING BUYER AND SELLER TOGETHER—If you wish to buy, sell or exchange, write us. Blacksmith shops, other business opportunities and farms throughout the country. Best method devised for selling and exchanging. Well worth while to send for list. **Myers & Myers, A 25, Matthews Bldg., Milwaukee, Wis.**

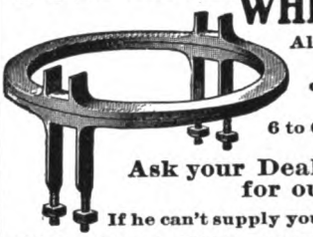
WANTED—Readers to advertise in this column. If you wish to buy, sell or exchange anything, your ad here will be seen and read by thousands of shop owners. Rates are very low. Write to American Blacksmith Company, Box 974, Buffalo, N. Y.

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Send sketch or model for free examination and report as to patentability. Patents promptly secured. Advice and book free; terms low; highest references, and best service. Patents advertised free.
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PATENTS FRANKLIN H. HOUGH, Washington, D. C. No attorney's fee until patent is allowed. Write for Inventor's Guide.

PATENTS Herbert Jenner, patent attorney and mechanical expert, 608 F St., Washington, D. C., established 1883; I make an examination free of charge and report if a patent can be had; also the exact cost. Send for circular.

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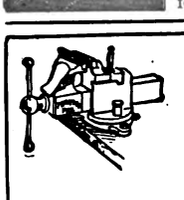
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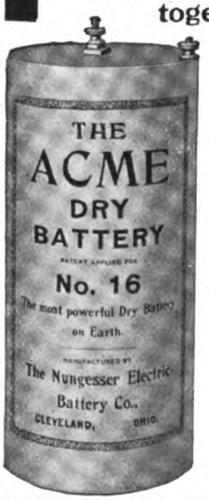
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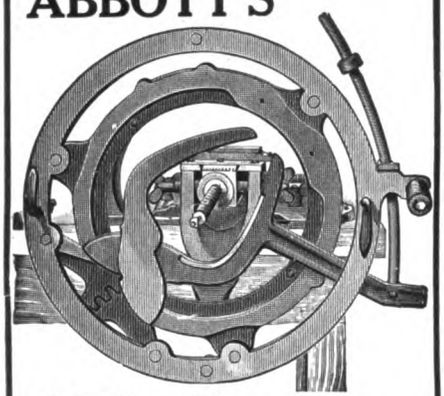
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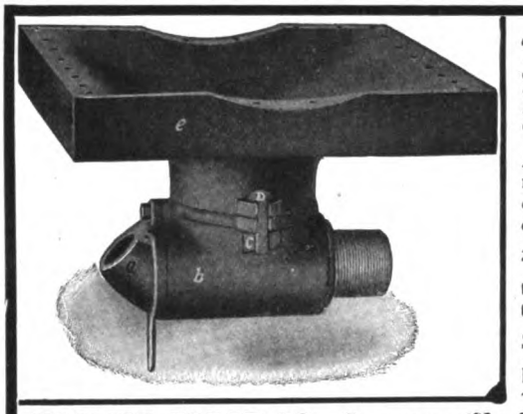
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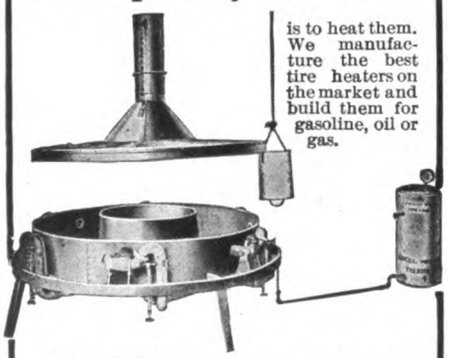
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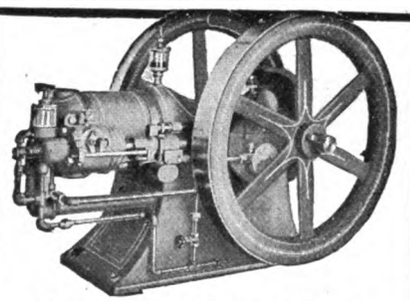
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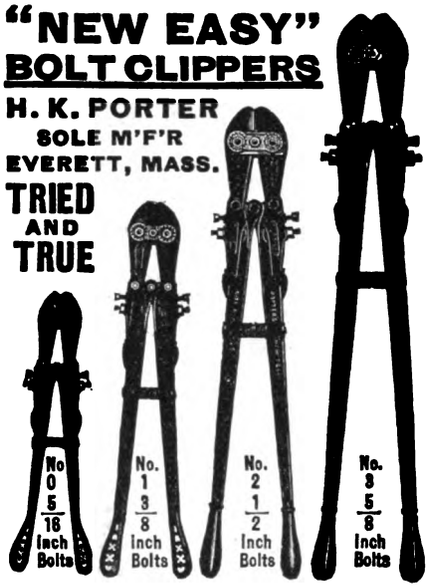
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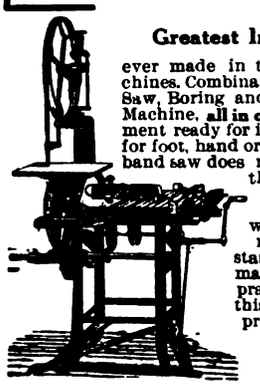
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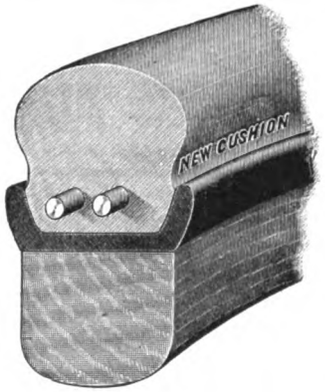
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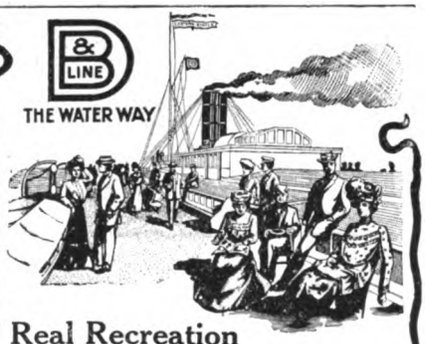
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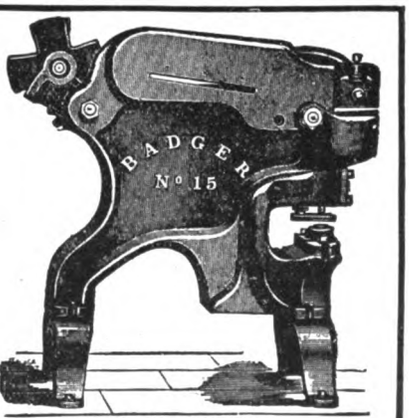
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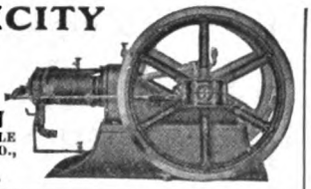
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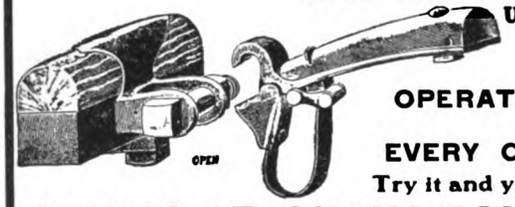
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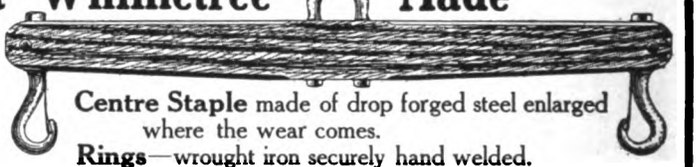


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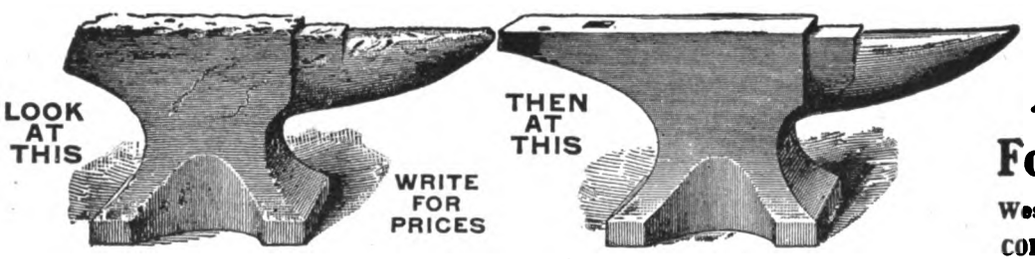


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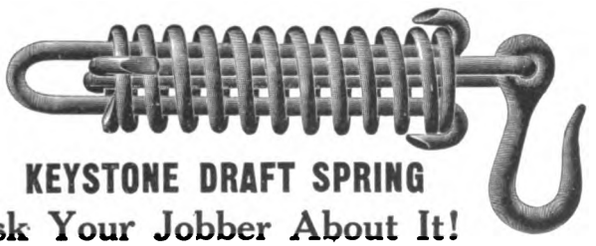
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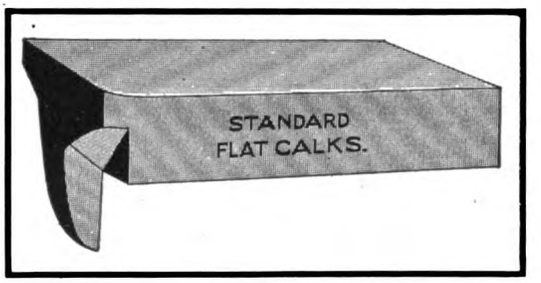
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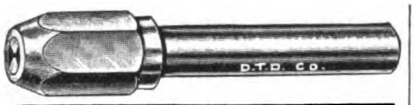
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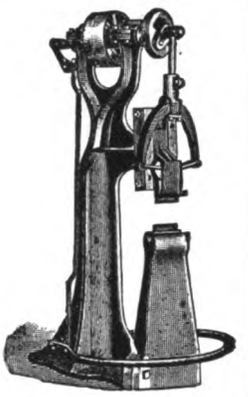


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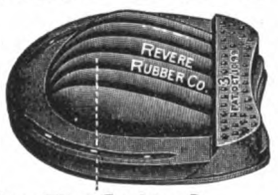
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See That Cushion?
It fills with air at each step. That's what breaks concussion. That's what prevents slipping. That's what keeps the foot healthy. That's what cures lameness.

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NO LAMENESS NO SLIPPING CHEAPEST AND BEST

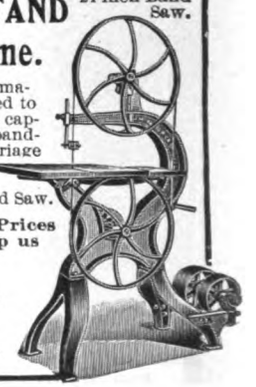


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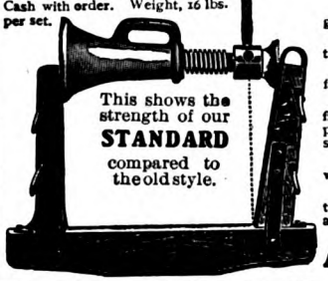


A well-made, accurate machine; especially adapted to run by gasoline engine; capable of all kinds of band-sawing, particularly carriage repair work. These are a few of the fine points of Marston's Band Saw.

We will gladly send Prices and Circulars. Drop us a Card today.

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We make the following sizes:
No. 1, 3 in. wide, 14 in. high
" 2, 3¼ " " 14 "
" 3, 3¼ " " 10 "
Price, $1.65 per set of 4 stks
Cash with order. Weight, 16 lbs. per set.



The Bruce Malleable Wagon Standard

This Malleable Iron Bolster Standard has been tested thoroughly, and we guarantee it strictly as represented.

Anyone familiar with the farm wagon will readily see the great advantages of the Malleable Iron Bolster Standard over the old style.

1. Made of the best grade malleable iron. It has been thoroughly tested by factories and wagon makers and pronounced a great success.

2. It is attached to bolster by means of two bolts passing through bolster from the side, and one bolt from top to bottom of bolster, thus holding standard perfectly solid, and at the same time strengthening end of bolster, which in old style is weakened by mortise.

3. The Malleable Iron Standard has a 3 1-2 in. face at base, which prevents wear on wagon box, while the old style has only a 7-8 inch face.

4. Great time saver. Can be attached to bolster in one-fourth the time required to put on wood stake. Adapted to new and repair work. The price will justify all classes of the trade in using this standard.

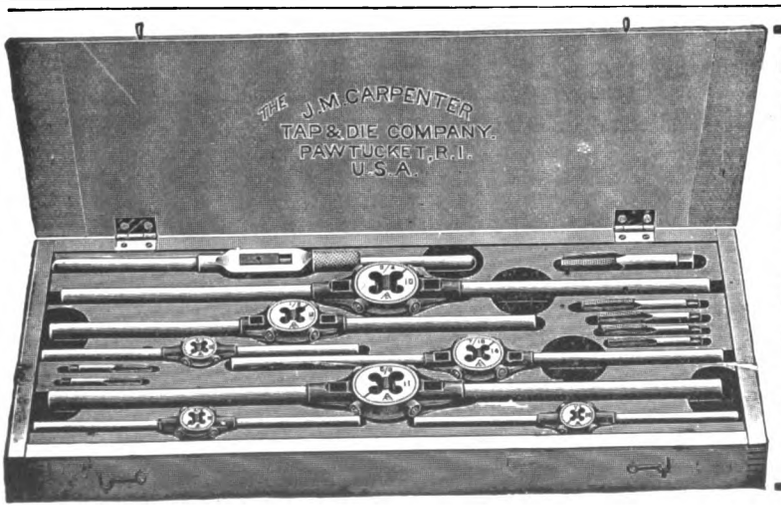
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With a stock for each die and the Original Nichols Tap Wrench.

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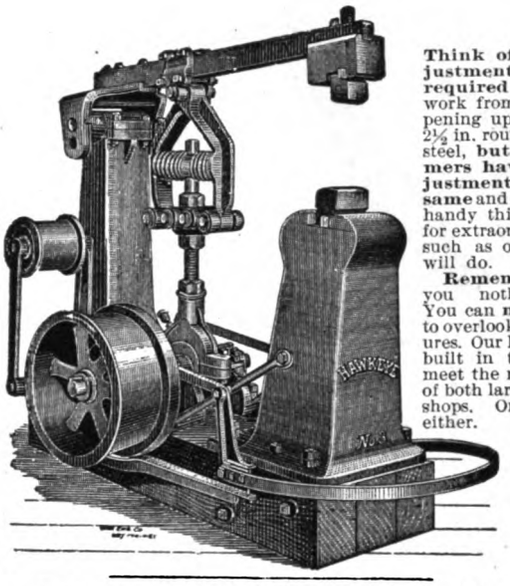
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FOR LESS MONEY

than any other power hammer on the market of equal QUALITY and CAPACITY



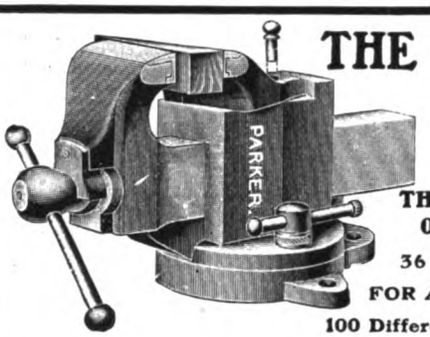
Think of it, no adjustment of stroke required to handle work from plow sharpening up to welding 2½ in. round or square steel, **but our hammers have the adjustment just the same** and it is a mighty handy thing to have for extraordinary work such as our hammers will do.

Remember, it costs you nothing extra. You can **never** afford to overlook these features. Our hammers are built in two sizes to meet the requirements of both large and small shops. One H. P. runs either.

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HAWKEYE M'F'G CO.
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THE MOST RELIABLE ON THE MARKET

36 Different Styles,

FOR ALL PURPOSES,

100 Different Sizes.

Parker vises will be found in the best equipped shops in the country. No other vise has given to the trade such general satisfaction. Our new line of improved vises has reinforced sliding jaws, making the Parker vises stronger and more durable than ever.

Made of a blending of steel and best iron in the castings.

The steel faces on these vises are milled and fitted to the jaws and are removable. Have self-adjusting back jaws which automatically adapt themselves for holding wedge-shaped pieces.

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HANDY

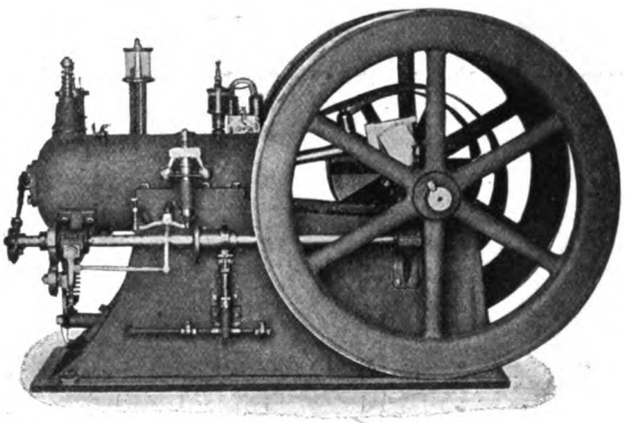


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Investigate Its Merits.

Easy and simple to operate; few parts; close regulation of speed; thorough system of lubrication; economical; reliable; safe; durable and strong. Just the engine you are looking for to make your shop life easy. All sizes—1½, 2, 4, 6, 12 and 15 H. P. Stationary and Portable.

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BUY WHEELS DIRECT FROM THE FACTORY

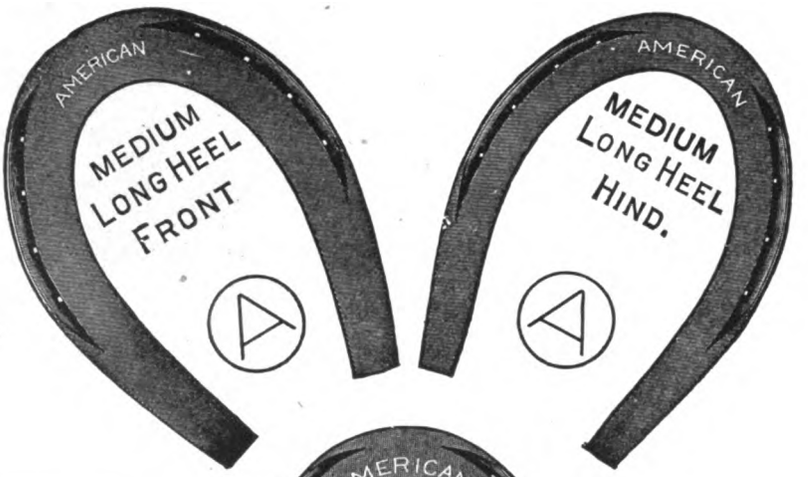
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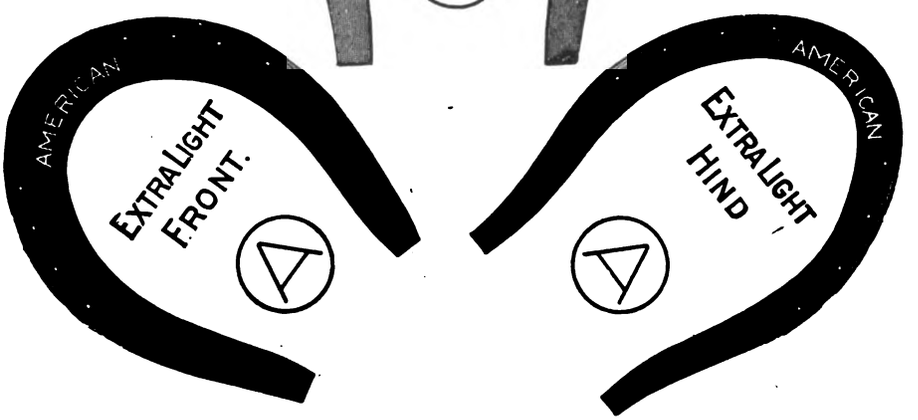
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Stationary, 1 to 150 H. P.
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Over 30,000 in operation.
Safe, Reliable, Economical
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Now made of high carbon steel.



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WITH 4-IN. TIRE STEEL WHEELS
Our wagons are well ironed throughout—wheels made with ound staggered spokes.



We make any size wheels to fit any skein.
We manufacture a complete line of metal wheels for corn planters, cultivators, plows, etc.
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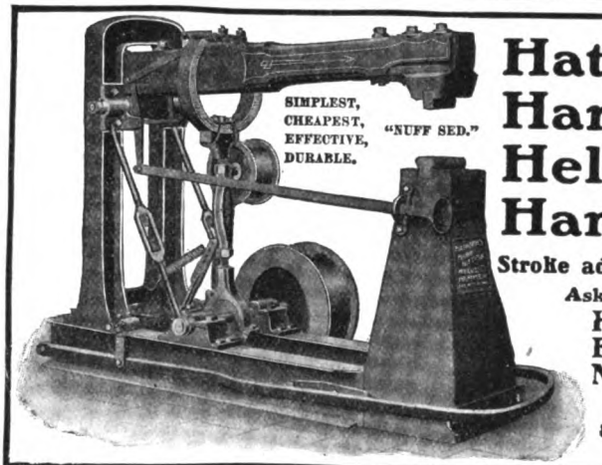
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For Plow Work, Wagon Work, Heavy Work, Any Work.
"We have been using the Boss power hammer for several years and it has given entire satisfaction. We are well pleased with it and would not be without it in our shops."
Look & Lincoln, Virginia, Mfrs. of Wagons.
G. E. DAVIS, Mgr.,
DUBUQUE, IOWA.

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EMERY WHEELS CUT QUICK
A wheel that will do the work in one-fourth to one-half less time is by far the cheapest in the long run. A wheel that will save only one hour per day during your busy season would pay for itself in full.





NATIONAL SAFETY SHORT-TURNING FIFTH WHEELS
have been on the market for over
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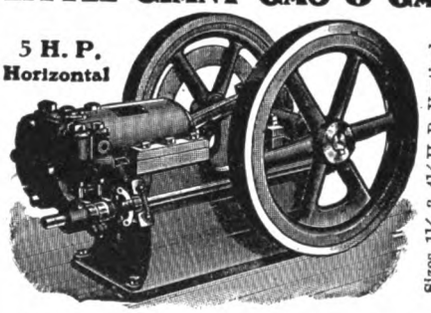


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Stroke adjustable while running.
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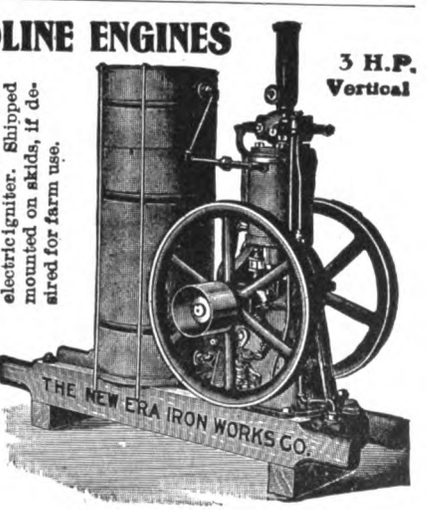
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5 H. P. Horizontal



Sizes, 1½, 3, 4½ H. P. Vertical. 5 to 25 H. P. Horizontal. Either tube igniter or electric igniter. Shipped mounted on skids, if desired for farm use.

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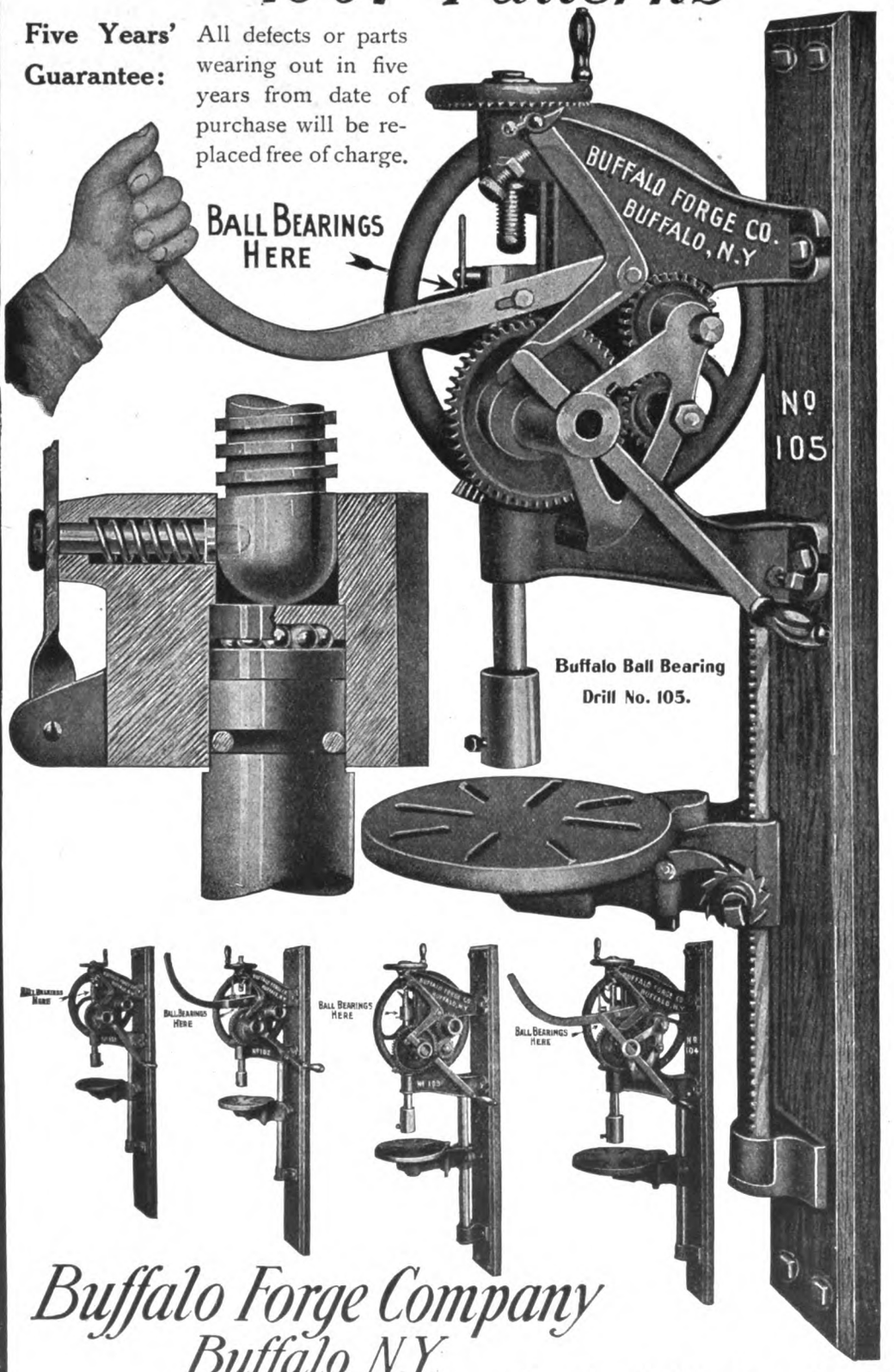


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BUFFALO 1907 DRILLS.

5 Sizes
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5 Prices
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Ball - Bearings where they count, on the high speed spindle, ***not*** on the slowly rotating feed mechanism.
No Lock-Nuts to take the thrust – Buffalo 1907 Drills are free from these by-gones.
Pin Clutch; Nut Closing Devices avoided.
Combination Lock - Nut, Ball - Bearing & Pin Clutch.
Bearings ***bored*** and ***reamed*** in solid metal, no liners used.

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Buffalo, N.Y.

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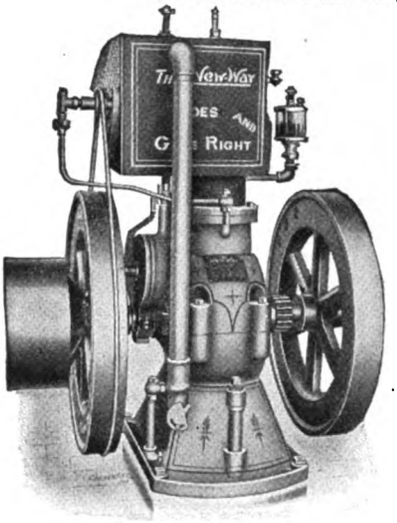
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"Goes and Goes Right."



Cool all day.

Always ready to go summer and winter.

Excels in running machinery that requires full power all day.

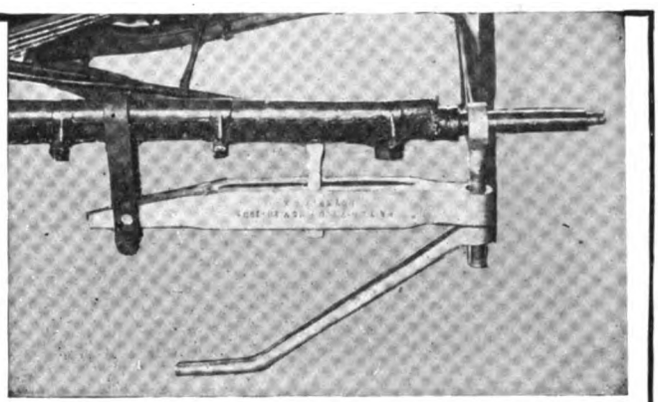
The "NEW WAY" is entirely different from the ordinary engine, better made, lasts longer.

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Write us today for special proposition B 1 and catalog.

The "New-Way" Motor Company
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60 Sheridan Street.



STEDHAM COLD AXLE SETTER AND STRAIGHTENER.

A Labor and Time Saving Machine that does its work perfectly.

For setting or straightening Buggy Axles and all vehicles having a steel axle, Also Pitman rods of mowers, reapers and binders, bent rods and shafts in section harrows, cultivator beams, shaftings, etc.

The axle can be straightened in the vehicle **cold**, better than to take it out and heat it, and in one-tenth the time. Saves all the trouble of taking the axle out. No scarring of the wood or breaking of the paint.

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Dear Sir:—The "Cold Axle Setter" that I bought from you, does the work splendidly. It is the best investment I ever made in my shop.

Further particulars on request. Or will ship at once on receipt of price, $10.00.

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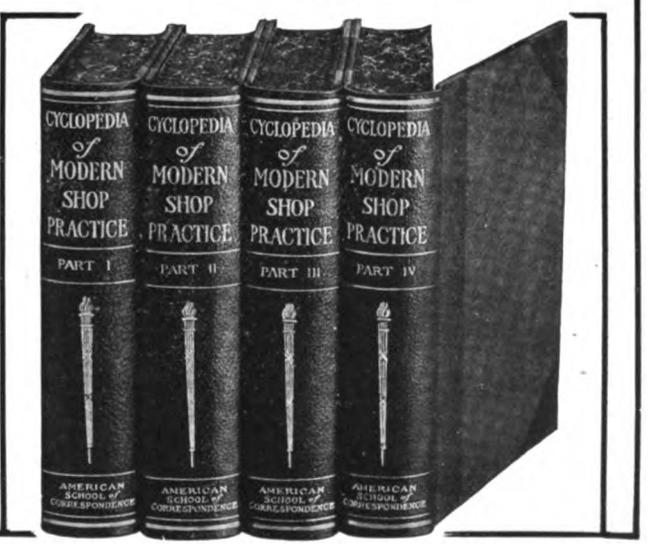
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than you can buy a similar style from Expensive City-Grade Builders, on whose high-priced work dealers cannot make the same percent profit as on ours.



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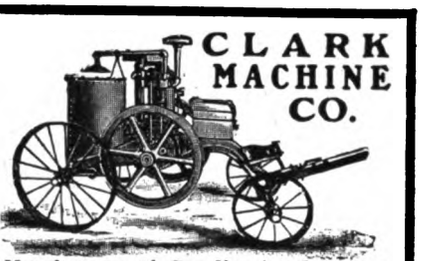
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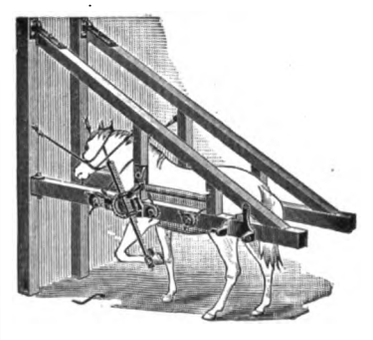
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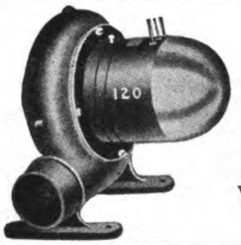
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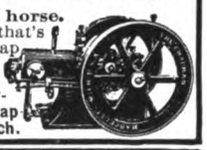


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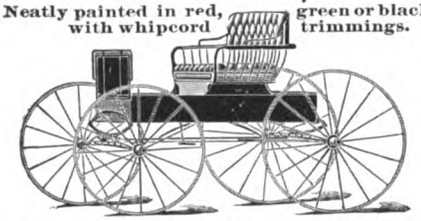
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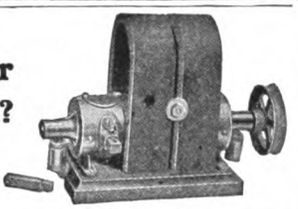
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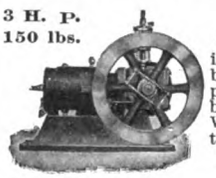
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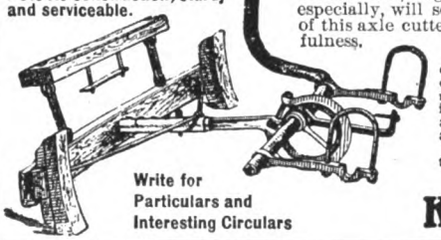
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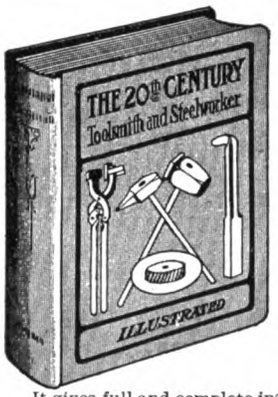
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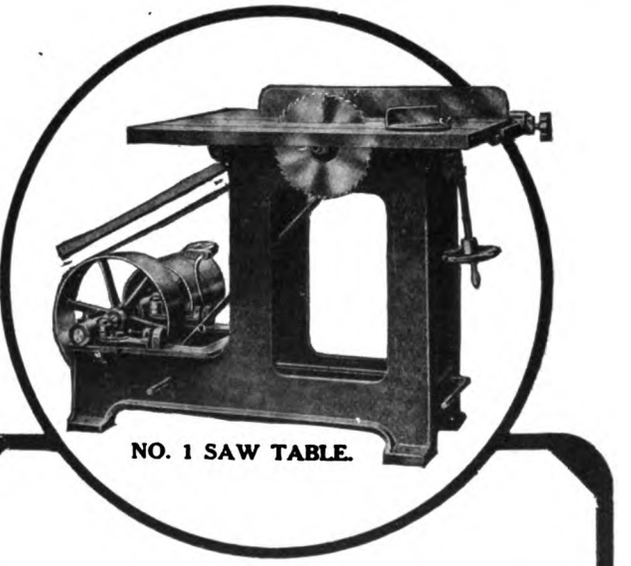
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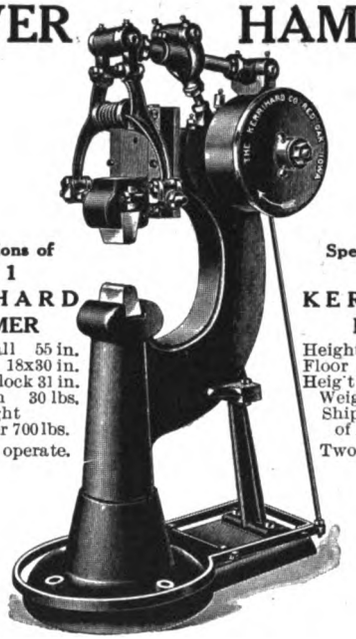
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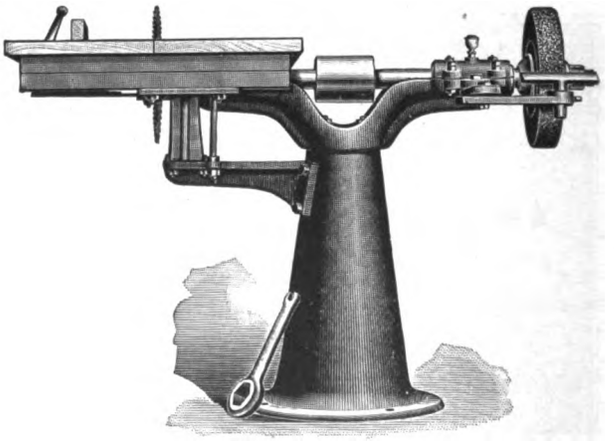
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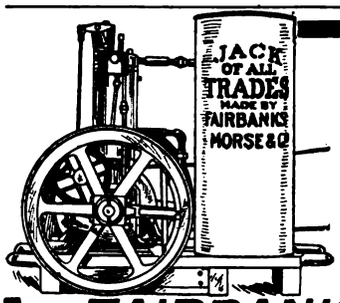
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Translated from the 10th German edition by John W. Adams, A.B., V.M.D.
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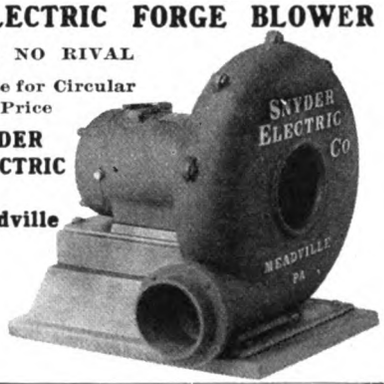
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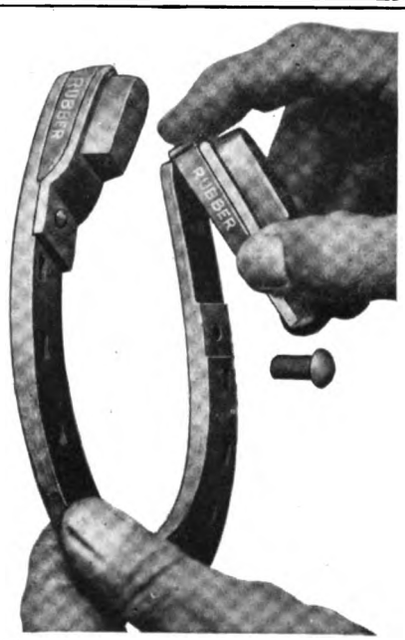
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Enable you to turn out better jobs.
Isn't it just like finding money? Why not become an agent and install one in your shop where your customers can see it run? Send for agency proposition No. 487 A P.
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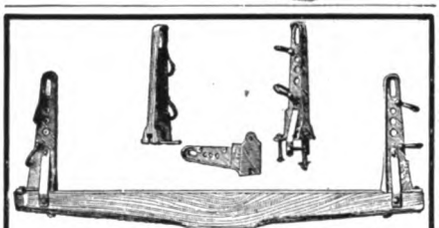
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Malleable Iron Wagon STANDARD
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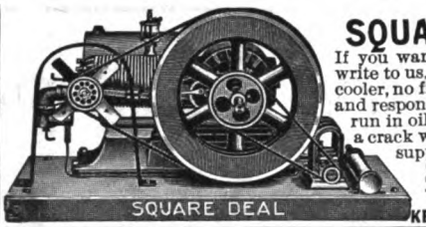
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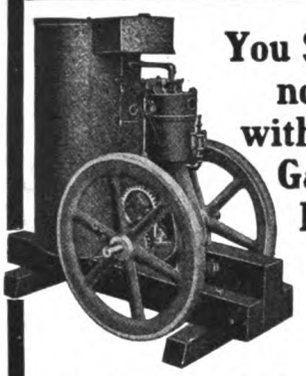
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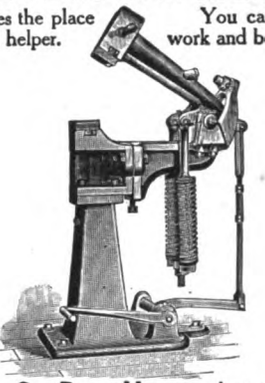
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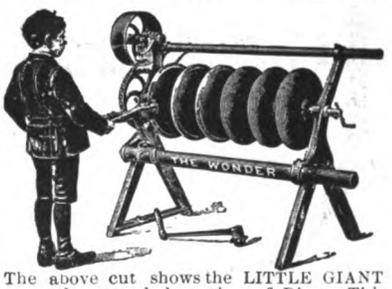
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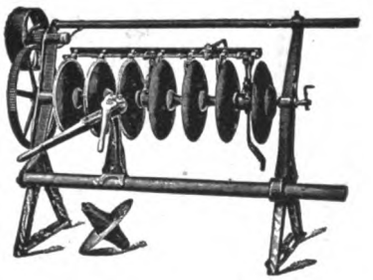
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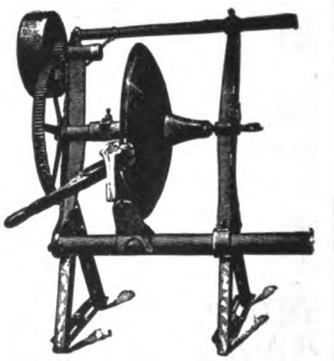
THE WONDER DISC SHARPENER



The above cut shows the LITTLE GIANT at work on a whole section of Discs. This machine is especially adapted for sharpening Disc Harrows.



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WITHIN the short time these disc sharpeners have been on the market, they have won ON MERIT a place in thousands of the best shops throughout the United States and Canada. They are in use in nearly every state in the Union, in Canada and in Mexico.

Sold by leading jobbers everywhere.

The only Sharpener made adjustable to all conditions. Can shear any part of edge to any bevel. Can shear back from edge as far as necessary. Can use tool on either side of disc. Can shift from one disc to another. Can do all this without the turn of a set screw or nut, is a positive feed, automatically adjusts itself to wobbling or bent discs. Knives made of best grade of self-tempering tool steel, will last a life-time. Ask your Jobber for them or write for illustrated descriptive circular--- SENT FREE ON REQUEST.

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NOTHING TO WEAR OUT **THE FUEL SAVER** **NO SMOKE**

GUARANTEED FOR FIVE YEARS

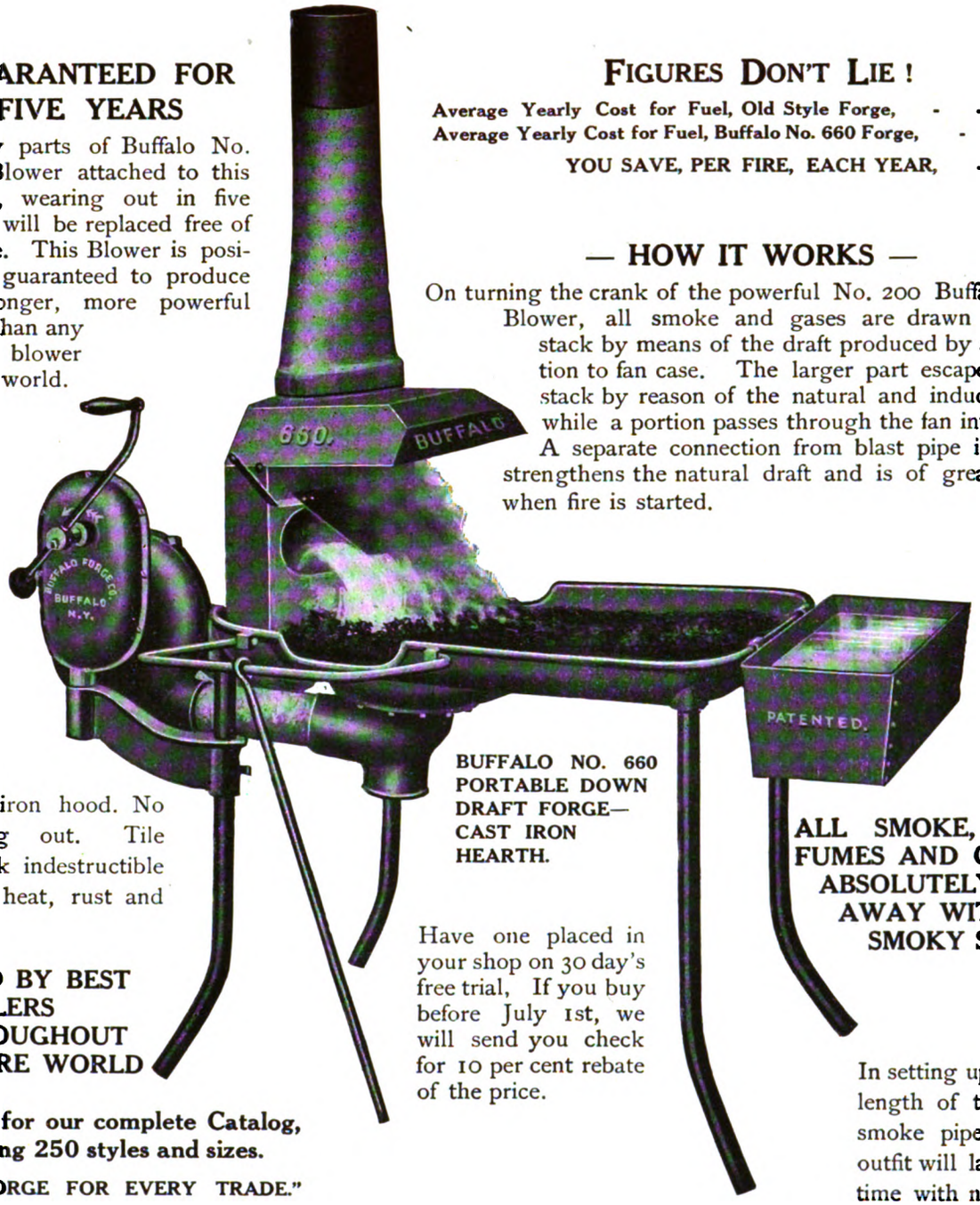
Any parts of Buffalo No. 200 Blower attached to this Forge, wearing out in five years, will be replaced free of charge. This Blower is positively guaranteed to produce a stronger, more powerful blast than any other blower in the world.

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YOU SAVE, PER FIRE, EACH YEAR, -	18.33

— HOW IT WORKS —

On turning the crank of the powerful No. 200 Buffalo Hand Blower, all smoke and gases are drawn into the stack by means of the draft produced by a connection to fan case. The larger part escapes up the stack by reason of the natural and induced draft, while a portion passes through the fan into tuyere. A separate connection from blast pipe into stack strengthens the natural draft and is of great service when fire is started.



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Cast iron hood. No rusting out. Tile stack indestructible from heat, rust and gases.

SOLD BY BEST DEALERS THROUGHOUT ENTIRE WORLD

Have one placed in your shop on 30 day's free trial, If you buy before July 1st, we will send you check for 10 per cent rebate of the price.

ALL SMOKE, GASES, FUMES AND CINDERS ABSOLUTELY DONE AWAY WITH. NO SMOKY SHOPS.

Send for our complete Catalog, showing 250 styles and sizes.

"A FORGE FOR EVERY TRADE."

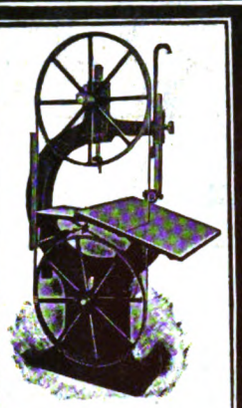
In setting up, use one length of tile in the smoke pipe and the outfit will last a lifetime with no repairs.

BUFFALO FORGE COMPANY

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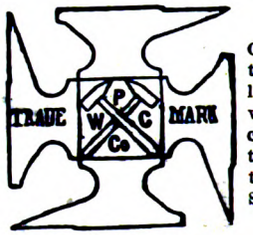
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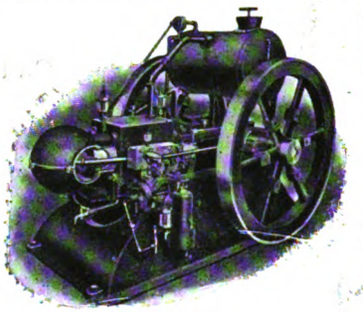
Harrisburg, Pa., March 26, 1907.

MR. A. W. SECOR,
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JACOB TIPPETT.

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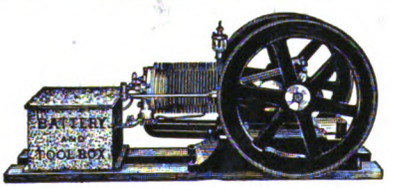


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Double Piston
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MONARCH



MONARCH

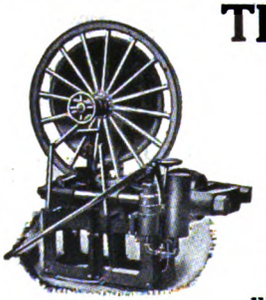
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They are an exceptionally good paying proposition. They are guaranteed in every respect. They work perfectly, simply, economically and, without a doubt, are a money-maker and a money-saver to both dealer and customer.

Our prices are right. Our dealings are right. Our goods are right—so it's up to you.

Give us a trial, or write us for descriptive circular and prices.

MONARCH MACHINE COMPANY,
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THE SCIENTIFIC HYDRAULIC TIRE SETTER

IS WHAT YOU WANT.

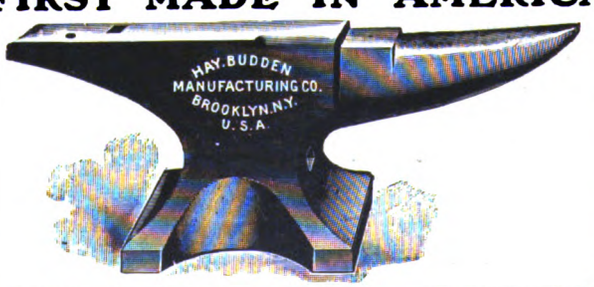
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FIRST MADE IN AMERICA

The Gold Medal Anvil
HIGHEST AWARD
OMAHA, 1898 PAN-AMERICAN, 1901

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Over 100,000 in Use
WARRANTED
WEIGHTS FROM 10 to 800 LBS.

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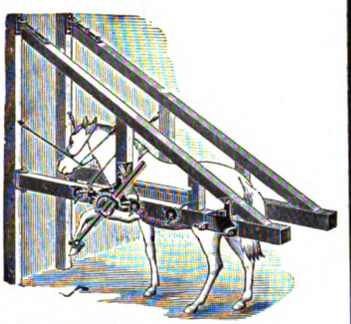
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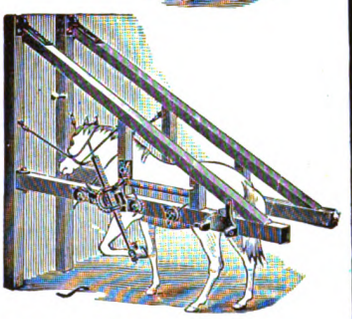
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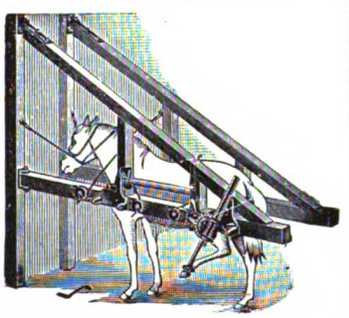
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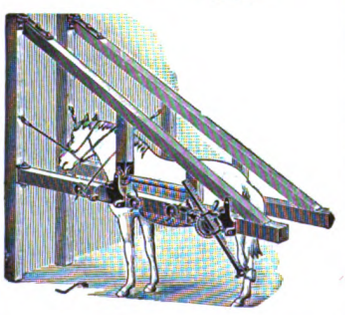
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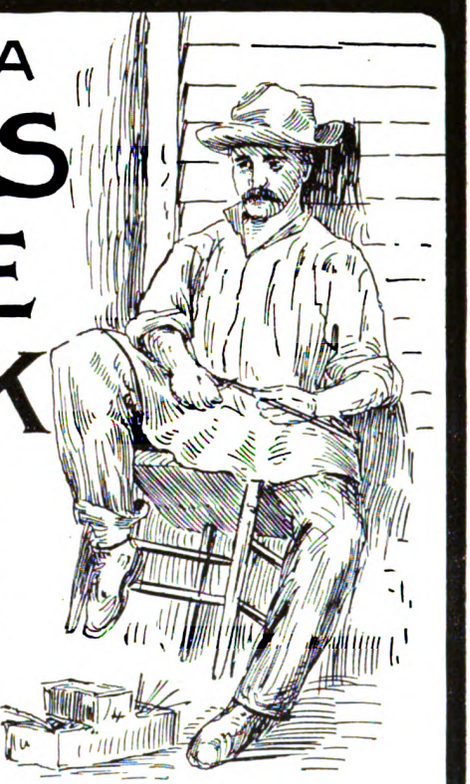








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Thousands of wise shoers have Barcus Stocks in their shops. We will gladly give you the names of some of your brother craftsmen who are now using our stocks. You can write to them and they will tell you why you should have one.

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HOW many times have you seen our ads before? A good many, perhaps, for they've been here for years.

But if you have never yet sent for our printed matter to find out more about our tools, the reading of the ads didn't do you much good, did it?

If you saw silver dollars lying around your door, would you bother to take time to pick them up?

Yet who can tell how many dollars might float your way by investing two minutes' time and a post card, asking for our new 1907 Machinery Catalog?

Isn't it worth that much to find out?

You'll certainly learn something about "Silver" quality and that really means silver dollars for you.

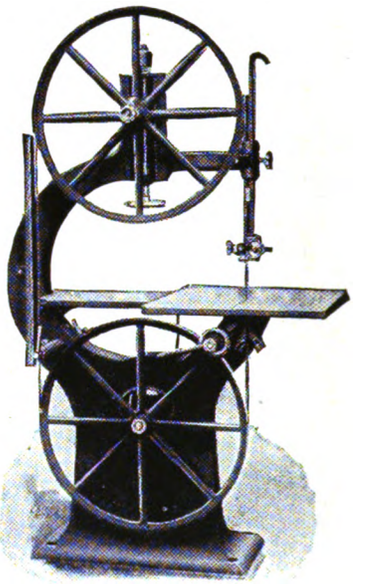
Silver Manfg. Co.

365 Broadway,

Salem, Ohio, U. S. A.

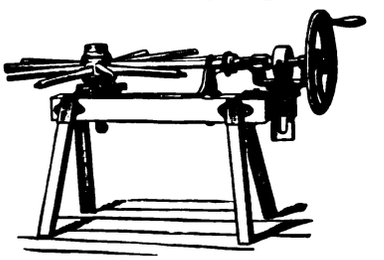
Improved Band Saws

Foot and belt power. New patterns throughout—rigid, symmetrical construction, new table tilting device, perfectly balanced wheels. Belt shifter, adjustment of upper wheel, saw guide, tension of saw blade, etc., all within easy reach of the operator. Sizes, 20 to 36 inches.



Spoke Tenon Machine

Dole and Deming's patent for hand and power; cuts tenons on spokes and does it perfectly. Its absolute accuracy adapts it to highest grade work.



Portable Forges

We make 14 kinds of Portable Forges. We have a size to suit your needs. Strong and durable. Attractive designs.

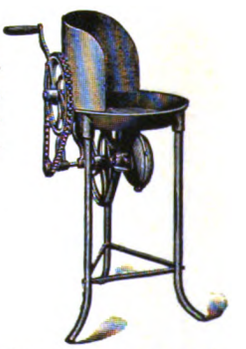
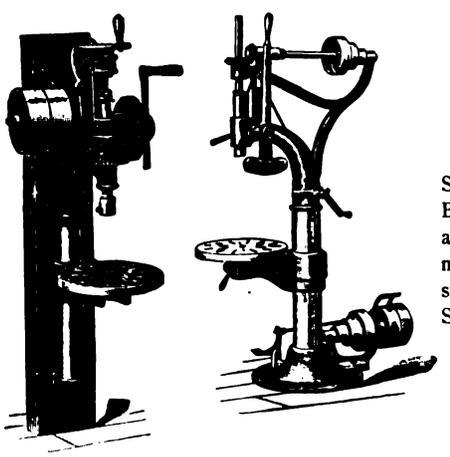


Fig. 901, with Shield.

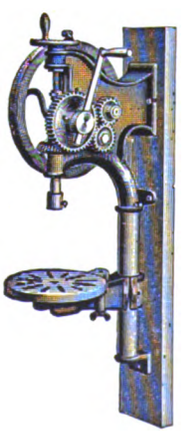


Fig. 925.



Drills

Swing, Post and Bench Drills for hand and power. Automatic feeding, new simple and efficient. Strong and durable.

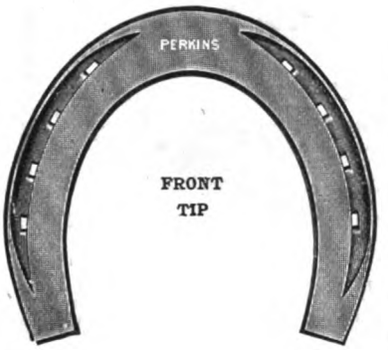


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HIND
LONG HEEL.

Look for this Trade Mark ★ The Star brand beats all others



FRONT
TIP



FRONT
LIGHT.



FRONT
TOE WEIGHT.

★PERKINS★
HORSE SHOES
AND
TOE CALKS
The **SUPERIOR** Kind

Have more points of superiority than any other make. An up-to-date shoe for up-to-date Blacksmiths.



HIND
SIDE WEIGHT.

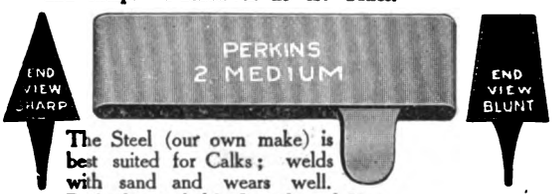
Perkins Shoes have given satisfaction wherever used. Our line is complete and every shoe guaranteed. Made in all styles and sizes. Send for sample. New Pattern Front Extra Light and Light. Free for the asking. We will gladly send

COMPLETE CATALOGUE AND SAMPLES FREE.

WRITE TODAY.

PERKINS

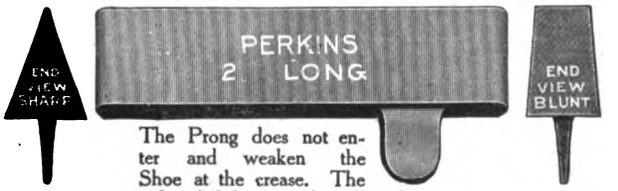
Made in Medium and Long, both blunt and sharp. Packed in 25 lb. boxes.



The Steel (our own make) is best suited for Calks; welds with sand and wears well. Perfectly graded in Length and Size.

TOE CALKS

Chisel Pointed Prong. These cuts show exact size of No. 2. SAMPLES SENT FREE.



The Prong does not enter and weaken the Shoe at the crease. The only slightly curved Calk sold.

MANUFACTURED BY

RHODE ISLAND PERKINS HORSE SHOE COMPANY

PROVIDENCE, RHODE ISLAND.

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Buffalo 200 and 306 Blowers

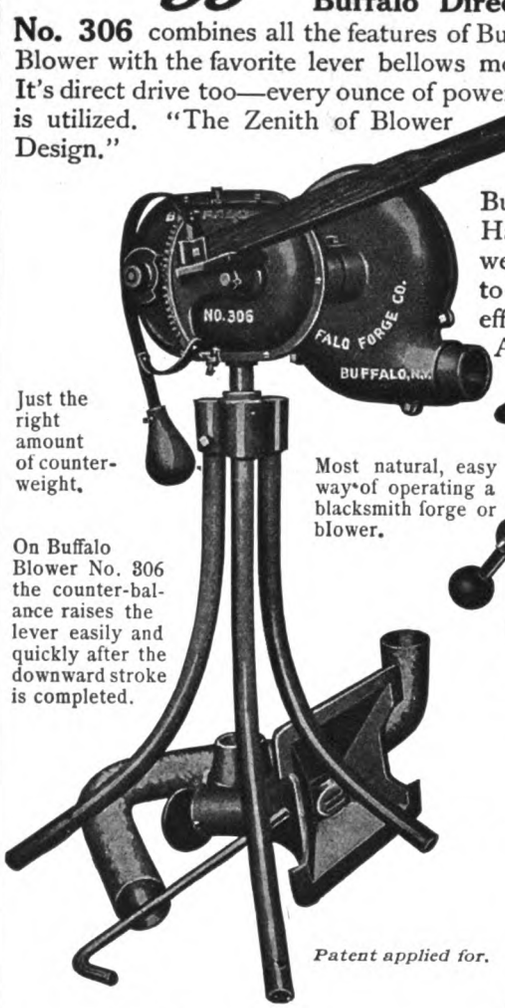
Buffalo Direct Drive Blower

No. 306 combines all the features of Buffalo No. 200 Blower with the favorite lever bellows motion. It's direct drive too—every ounce of power is utilized. "The Zenith of Blower Design."

GUARANTEED FOR FIVE YEARS

GUARANTEED FOR FIVE YEARS

Buffalo Nos. 200 and 306 Geared Hand Blowers are guaranteed to outwear any others on the market and to produce a stronger blast with less effort than any other blower built. Any parts wearing out in five years will be replaced free of charge and no questions asked.



Just the right amount of counter-weight.

On Buffalo Blower No. 306 the counter-balance raises the lever easily and quickly after the downward stroke is completed.

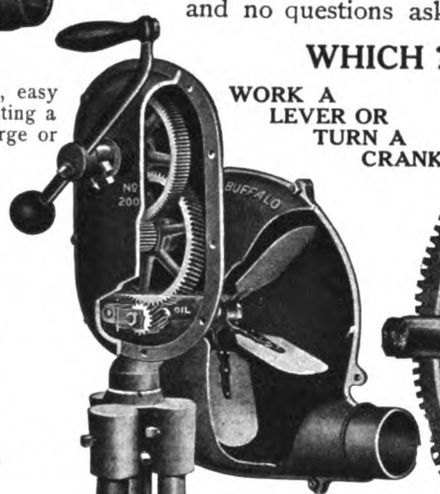
Patent applied for.

Buffalo Direct Drive Blower No. 306 with new H. H. Tuyere.

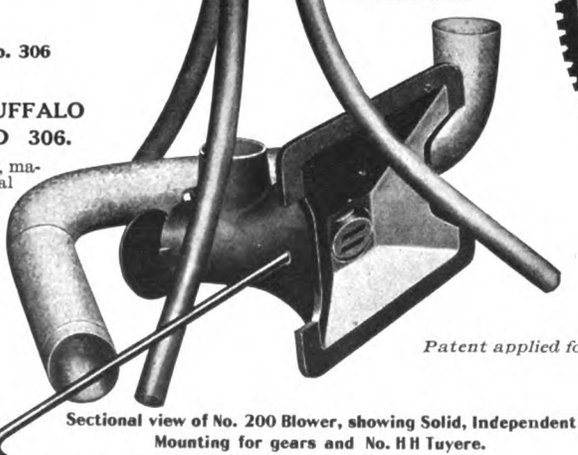
WHICH ?

WORK A LEVER OR TURN A CRANK?

Most natural, easy way of operating a blacksmith forge or blower.



Crank turns opposite to hands of a clock. Cut shows right hand blower—can also be built left hand.

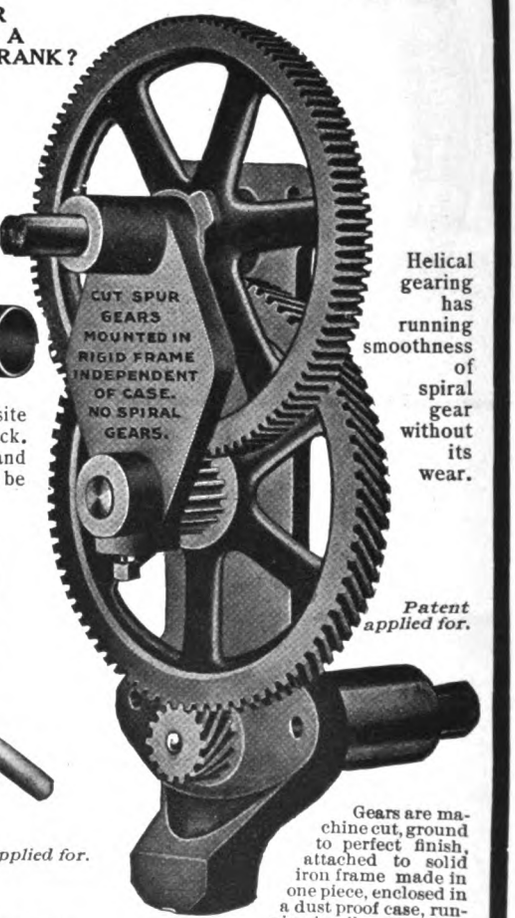


Patent applied for.

Sectional view of No. 200 Blower, showing Solid, Independent Mounting for gears and No. H H Tuyere.

GEARING.

No Spiral Gears to wear out.



Helical gearing has running smoothness of spiral gear without its wear.

Patent applied for.

Gears are machine cut, ground to perfect finish, attached to solid iron frame made in one piece, enclosed in a dust proof case, running in oil. A perfect self-oiling machine.

TELLING POINTS OF BUFFALO BLOWERS NOS. 200 AND 306.

GEARS—Heavy, with large, strong, machine cut teeth, cut spur and helical variety, which reduces friction and increases efficiency.

BEARINGS—Bored from solid castings and reamed to gauge, ensuring perfect alignment and easy, silent running.

OILING—Gears constantly run in oil, keeping the working parts perfectly lubricated.

New 1907 Catalog sent on request.

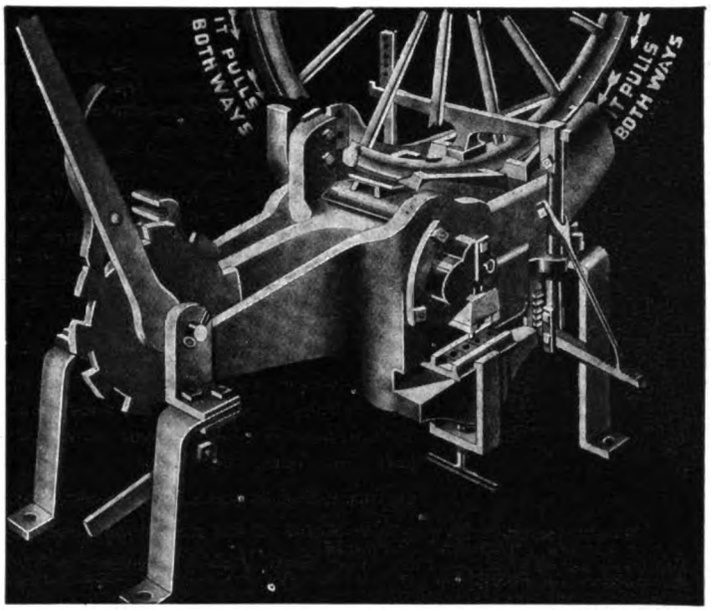
Sold by Best Dealers Throughout Entire World.

Buffalo Forge Company
Buffalo, N.Y.

Canadian Friends Buy of The Canadian Buffalo Forge Co., Ltd., Montreal, and Save Duty.

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THE HOUSE COLD TIRE SETTER



We invite you to visit our exhibit at the Jamestown Exposition in the Transportation Building and see our latest improved machine. Let us show you how it is that they will easily do $60 to $70 worth of tire setting in a day, and show you how they can cut all kinds of iron and punch all kinds of holes, and do it as fast as you can count.

Come and see for yourself and then you will know why it is that our oldest customers are our best pleased ones, and why it is that our machines never break up nor wear out, and how it is that we have three machines in one, and yet it is so very simple, neither one interferes with the other. Each of them just as serviceable as it could be if we had used the entire six hundred pounds of steel in its construction. In fact each one does have the benefit of the entire strength of the machine. So thereby we give you the three machines for the price of one.

We received a silver medal at the St. Louis World's Fair, whilst none of our competitors received higher than a bronze medal. Now with our machine so much improved and the shear and punch added, you can see why we expect a gold medal. But if you can or cannot attend the Fair, in consideration of the above, why not send us in your order?

OFFICE AND FACTORY,

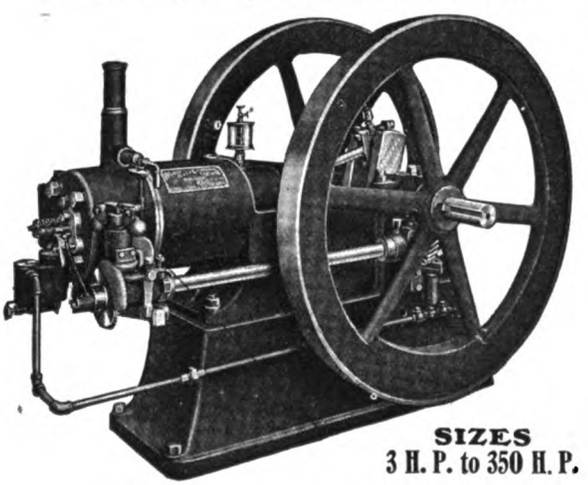
HOUSE COLD TIRE SETTER CO. **216-220 So. Third St.. ST. LOUIS, MO., U. S. A.**
J.F. House, No. 40 Church St., Toronto, Ontario, Can.

WEBER GAS GASOLINE ALCOHOL ENGINES

THE POWER FOR YOUR SHOP

INCREASE YOUR OUTPUT! DOUBLE YOUR PROFIT!

ENID, Oklahoma,
Weber Gas Engine Co,
Gentlemen;—
I am using a 6 H. P. Weber Engine and will say it is all you claim it to be. It works fine and gives steady power. I would not want an engine to start easier, and it is also economical in the use of gasoline. The fact is, I would not be without it as my power is always ready. Every up-to-date Blacksmith and Wagon Maker should have one of these engines. It is astonishing how simple they are and how easy to run.
Yours truly
WM. HACKETT.



SHAWNEE, Ks.
Weber Gas Engine Co.
Gentlemen:
I will say that in my experience I have found the Weber to be the best engine made. The reason why I bought the "Weber" is because it is the simplest one to keep in order.
My engine runs Grindstone, Emery Wheel, Turning Lathe, Rip Saw, Cut-Off Saw and Drill Press.
I purchased my engine about the 23rd of May, 1904, and it is as good as new today. I use it every day and I will buy another Weber when this one is worn out.
Yours truly,
J. C. KEENAN.

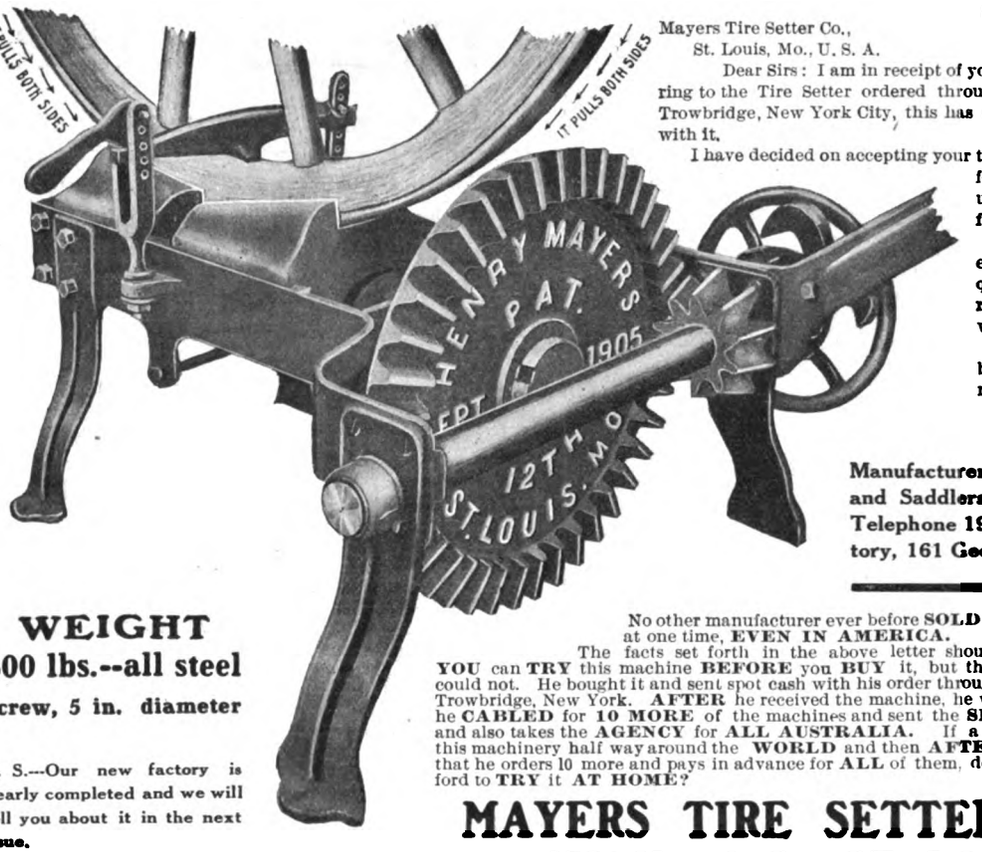
HIGHEST AWARD
ESTABLISHED 1884 PRODUCER
WEBER
GAS GASOLINE ENGINES AND HOISTS
GOLD MEDAL

SIZES
3 H. P. to 350 H. P.

Write for descriptive catalog, stating the H. P. you want.

Weber Gas Engine Co., P. O. Box 400. Kansas City, Mo.

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SYDNEY, Australia, June 6, 1907.

Mayers Tire Setter Co.,
St. Louis, Mo., U. S. A.

Dear Sirs: I am in receipt of yours dated Feb. 9th last. Referring to the Tire Setter ordered through my agents, Messers Strong & Trowbridge, New York City, this has arrived and I am well satisfied with it.

I have decided on accepting your terms regarding the sole agency for Australasia, and on the 29th ult. I cabled a further order to you for 10 machines. * * *

The price I put on will not be extortionate, as I want to sell a quantity and put them within the reach of all those whose business would be benefitted by their use.

Trusting that this will be the beginning of an extensive business between us, I am, dear sirs,

Faithfully yours,

H. HILLIER,

Manufacturer and Importer of Coach and Saddlers' materials. Terms Cash. Telephone 198 Glebe. New coach factory, 161 George St. West.

WEIGHT
800 lbs.--all steel
Screw, 5 in. diameter

P. S.---Our new factory is nearly completed and we will tell you about it in the next issue.

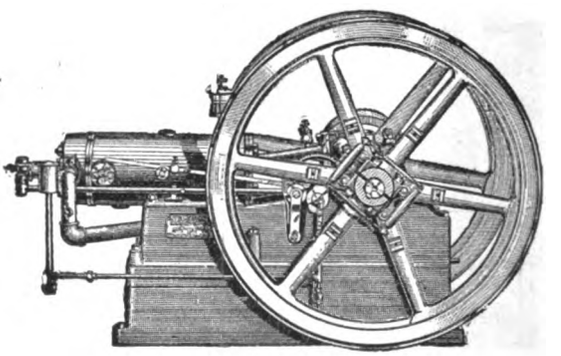
No other manufacturer ever before **SOLD 10** cold Tire Setters to one party at one time, **EVEN IN AMERICA.**

The facts set forth in the above letter should **MEAN** something to **YOU. YOU** can **TRY** this machine **BEFORE** you **BUY** it, but this gentleman in **AUSTRALIA** could not. He bought it and sent spot cash with his order through his agents, Messers. Strong & Trowbridge, New York. **AFTER** he received the machine, he was so well satisfied with it that he **CABLED** for **10 MORE** of the machines and sent the **SPOT CASH** for **all 10** of them, and also takes the **AGENCY** for **ALL AUSTRALIA.** If a man can pay in advance and ship this machinery half way around the **WORLD** and then **AFTER** trying it, be so well pleased that he orders 10 more and pays in advance for **ALL** of them, does it not look like **YOU** could afford to **TRY** it **AT HOME?**

MAYERS TIRE SETTER MFG CO.,
1721 N. 8th St., ST. LOUIS, MO.

BLACKSMITH'S POWER

Power in abundance
Power when called for
Reliable
Economical
Simple



I. H. C. GASOLINE ENGINES

are of widest adaptation to uses, and combine maximum efficiency with economy, whether on steady run or on the little jobs requiring constant stopping and starting. Use either gas, gasoline, or alcohol for fuel. Made in the following styles and sizes:

VERTICAL—2 and 3-H. Power.
HORIZONTAL (Stationary and Portable)—4, 6, 8, 10, 12, 15 and 20-H. Power.

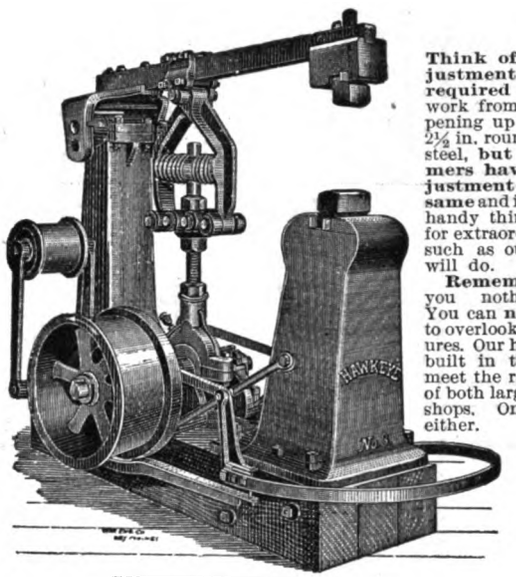
Call on the local International agent for catalog and particulars, or write home office.

International Harvester Company of America,
(Incorporated)
7 U Monroe Street, CHICAGO, U. S. A.

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The Hawkeye Power Hammer
FOR LESS MONEY

than any other power hammer on the market of equal QUALITY and CAPACITY



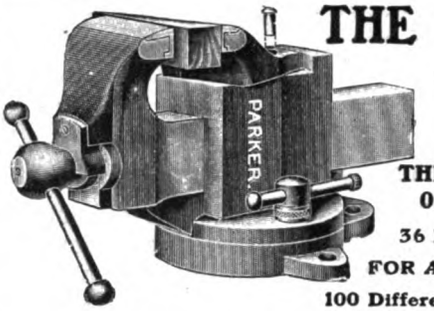
Think of it, no adjustment of stroke required to handle work from plow sharpening up to welding 2½ in. round or square steel, **but our hammers have the adjustment just the same** and it is a mighty handy thing to have for extraordinary work such as our hammers will do.

Remember, it costs you nothing extra. You can **never** afford to overlook these features. Our hammers are built in two sizes to meet the requirements of both large and small shops. One H. P. runs either.

For price and full description, address the

HAWKEYE M'F'G CO.
Cedar Rapids, Iowa.

THE PARKER VISES



THE MOST RELIABLE ON THE MARKET

36 Different Styles,
FOR ALL PURPOSES,
100 Different Sizes.

Parker vises will be found in the best equipped shops in the country. No other vise has given to the trade such general satisfaction. Our new line of improved vises has reinforced sliding jaws, making the Parker vises stronger and more durable than ever.

Made of a blending of steel and best iron in the castings.

The steel faces on these vises are milled and fitted to the jaws and are removable. Have self-adjusting back jaws which automatically adapt themselves for holding wedge-shaped pieces.

STRONG
DURABLE
HANDY

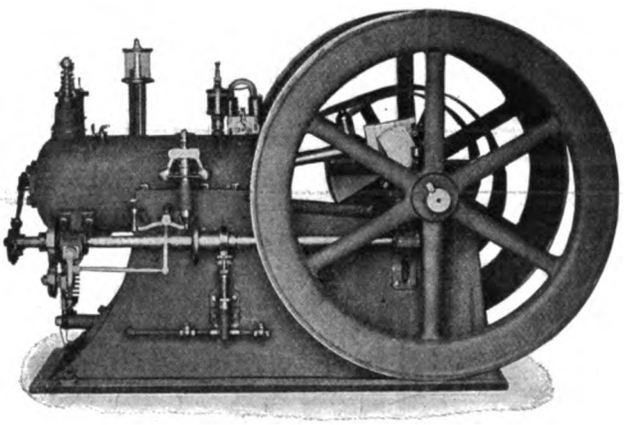


Our complete illustrated catalogue is free. Write today for price list also.

A tool of many uses. Both round and pipe jaws interchangeable. Weight, 76 lbs.

THE CHAS. PARKER CO.,
MERIDEN, CONN.

THE ANGOLA



Investigate Its Merits.

Easy and simple to operate; few parts; close regulation of speed; thorough system of lubrication; economical; reliable; safe; durable and strong. Just the engine you are looking for to make your shop life easy. All sizes—1½, 2, 4, 6, 12 and 15 H. P. Stationary and Portable.

OUR CATALOGUE IS FREE—WRITE. WE WANT AGENTS. GET OUR PROPOSITION.

THE ANGOLA ENGINE AND FOUNDRY CO.,
ANGOLA, INDIANA.

SAVE
The Dealer's Profits

BUY WHEELS DIRECT FROM THE FACTORY

We can save you money on all sizes of wheels; in the white, painted any color and with steel or rubber tires. We bore wheels for boxes without extra charge. Give us a trial order and we will make you one of our many satisfied customers. Write for special prices to ***American Blacksmith*** readers.

Carriage Wheel Supply Co.
UNION CITY, IND.

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THE MILTON MANUFACTURING CO.,

MILTON, PENN'A.

Manufacturers of **REFINED BAR IRON**

SUITABLE IN QUALITY FOR ALL PURPOSES.

We use Limit Gauges in rolling and guarantee our Bars uniform to size. We will gladly send you samples for test upon request. We are in position to make prompt shipment. We solicit your correspondence.

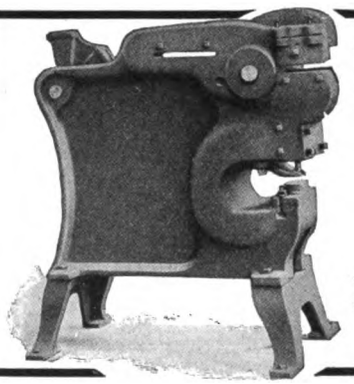
We also make Cold Punched and Hot Pressed Nuts.



REMY MAGNETOS

Will start and run your Gas or Gasoline Engine without the aid of batteries. Inexpensive and absolutely reliable for either make and break or jump spark ignition. Information sent on request.

Remy Electric Co., Anderson, Ind.



NO. 5 COMBINED PUNCH AND SHEAR.

Punches 5/8 in. hole through 5/8 in. iron.
Shears 5 in. x 1/2 in. flat iron bars.
Shears 1 1/4 in. round iron bars.
Shears 8 in. x 1/4 in. band iron.

Our large descriptive circular will interest you. So will our price.

Badger State Machinery Co.

19-25 Trinity St. Janesville, Wis.

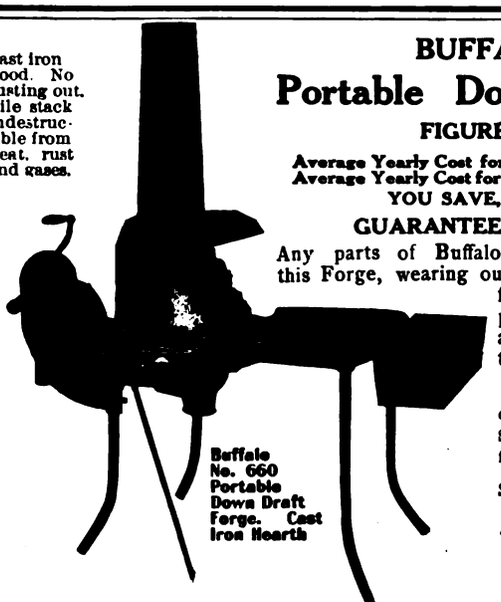
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in the smithing craft whose good will you especially esteem? There is no better way of showing your friendship than by a small gift. There is no gift which such a friend would appreciate more than a year's subscription to The American Blacksmith.

Write us for special terms.

American Blacksmith Co., Box 974, Buffalo, N. Y.

Cast iron hood. No rusting out. Tile stack indestructible from heat, rust and gases.



BUFFALO NO. 660 Portable Down Draft Forge

FIGURES DON'T LIE!

Average Yearly Cost for Fuel, Old Style Forge, $55.00
Average Yearly Cost for Fuel, Buffalo No. 660 Forge, 36.67
YOU SAVE, PER FIRE, EACH YEAR, 18.33

GUARANTEED FOR FIVE YEARS

Any parts of Buffalo No 200 Blower attached to this Forge, wearing out in five years, will be replaced free of charge. This Blower is positively guaranteed to produce a stronger and more powerful blast than any other blower in the world.

Have one placed in your shop on 30 day's free trial. If you buy before Sept. 1st, we will send you a check for 10 per cent. rebate of the price.

Send for our complete Catalog, showing 250 styles and sizes.

"A FORGE FOR EVERY TRADE."

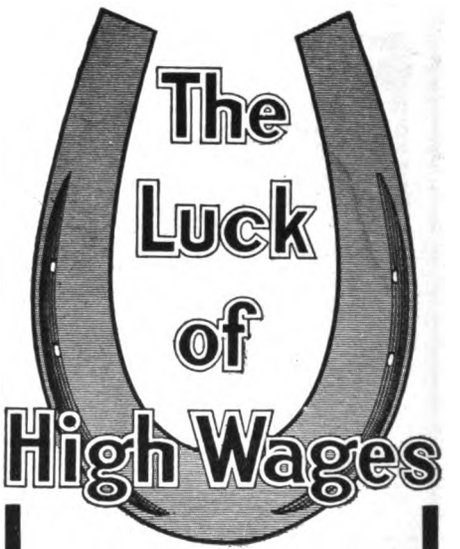
Sold by Best Dealers Throughout Entire World.

BUFFALO FORGE COMPANY, BUFFALO, N. Y.

The Canadian Buffalo Forge Co., Ltd., Montreal, Canada.

HONEST DEALINGS.

Before an advertisement is accepted for this Journal, inquiry is made concerning the standing of the house signing it. Our readers are our friends and their interests will be protected. As a constant example of our good faith in American Blacksmith advertisers, we will make good to subscribers loss sustained from any who prove to be deliberate swindlers. We must be notified within a month of the transaction giving rise to the complaint. This does not mean that we will concern ourselves with the settlement of petty misunderstandings between subscribers and advertisers, nor will we be responsible for losses of honorable bankrupts.



The **luck** of high wages is spelled with a capital P—it's P-l-u-c-k—the ability to find a practical, easy, and systematic way to secure a better position and increased earnings and the **pluck** to follow out that way persistently.

In this way, Robert Gordon, a blacksmith living at Revelstoke, British Columbia, followed the I. C. S. plan of securing a better position and is now Power House Manager for the city of Revelstoke at a salary of $1,500 a year.

In this way Harvey Brakeman, a carpenter of New Kensington, Pa., became an architect and increased his income from $2.25 a day to $5,000 a year.

In the same way **you** can increase your earnings, secure a better position and success in the easiest, most practical, quickest, and cheapest way in the world. All we ask is for you to write us and allow our experts to tell how we can adapt our system, which in 15 years has bettered the positions and earnings of hundreds of thousands of men, to your own personal needs, no matter how scant your time, money, or education may be. To secure this valuable advice free, it is only necessary to send us the coupon below. **Isn't a higher salary worth a postage stamp to you?**

International Correspondence Schools

Box 1302, Scranton, Pa.

Please explain, without further obligation on my part, how I can qualify for a larger salary and advancement to the position before which I have marked X.

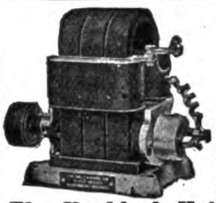
Foreman Molder	Electrician
Foreman Blacksmith	Architect
Foreman Machinist	Structural Engineer
Foreman Toolmaker	Contractor & Builder
Foreman Patternmaker	Foreman Plumber
Mechanical Engineer	Civil Engineer
Machine Designer	Surveyor
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"QUICK ACTION"
IGNITING DYNAMOS
Excel all others!

The only generator that cannot lose its magnetism. For either make and break or jump spark work. Also spark coils. Send for Catalogue B.

The Knoblock-Heideman Mfg. Co.,
SOUTH BEND, IND.

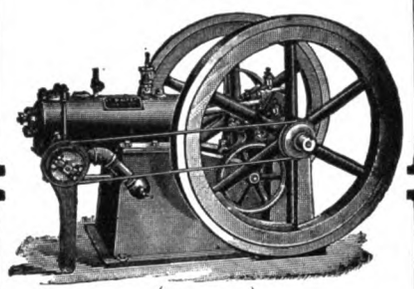
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253-257 Ellicott Street, Buffalo, N. Y.

Printers of THE AMERICAN BLACKSMITH, also Complete Equipment for the production of Machinery Catalogues, Stock Farm Catalogues, College Annuals, and Catalogues in Foreign Languages, promptly, accurately and tastefully : : : : : : : : : : : :

HAGEN
GAS AND GASOLINE ENGINES



(2-28 H. P.)

ECONOMICAL and RELIABLE POWER FOR THE SHOP-RUNNING BLACKSMITH and WAGON MAKER.

HAGEN ENGINES are recommended on account of their simplicity, durability, comparatively low price, small cost of operating and the ease and certainty with which they can be controlled.

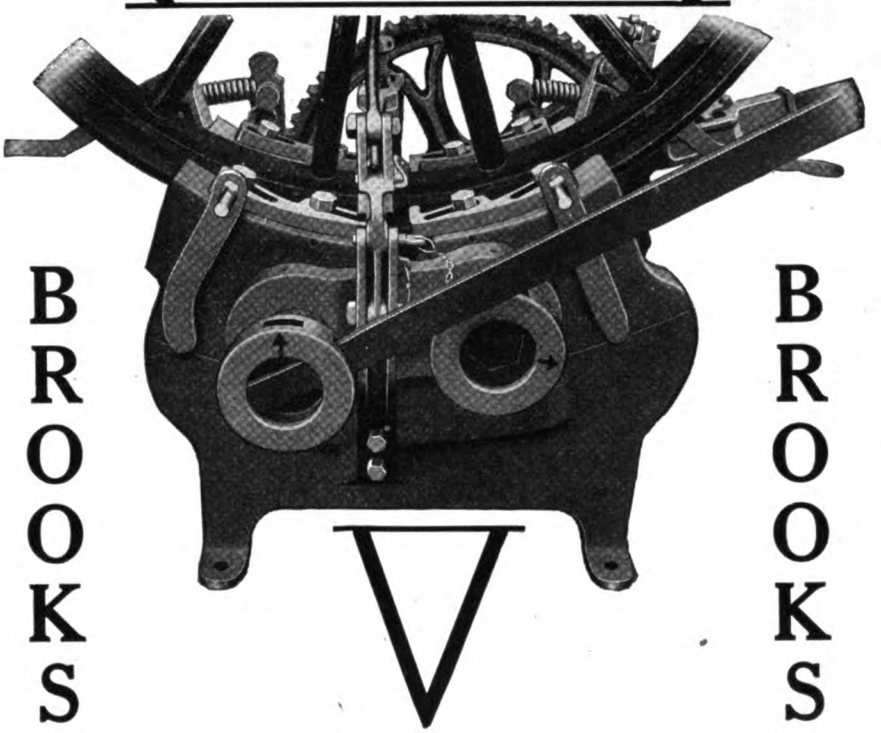
Our Catalogue explains all working parts. A postal will bring a copy to you. It's free. Write today.

HAGEN
GAS ENGINE AND MFG. CO.
Winchester, Ky., U. S. A.

THE BROOKS

has all the good features of other tire setters besides several special features of its own which our patents protect. This is the tire setter that will will do your work quickly and do it properly, the tire setter that is most widely used and giving universal satisfaction; the only tire setter made with a key adjusted and the necessary lateral or side movement of the draw heads, so that they line up with the tire and cannot bend it edgewise. Let us tell you all about this wonderful machine. Drop us a postal for more information. We make easy terms for payment.

The Brooks Tire Machine Co.
121 N. Water St., WICHITA, KANSAS.



BROOKS BROOKS

Scott's IXL ALL High Speed Steel

Will cut at least one speed faster than any other high speed steel on the market.

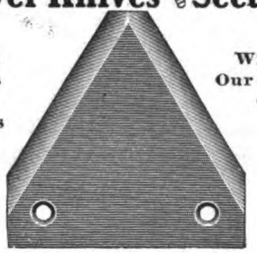
Write for Catalog covering entire line of SCOTT TOOL STEELS.

THE BOURNE-FULLER CO., Cleveland, O.

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Mower Knives AND Sections

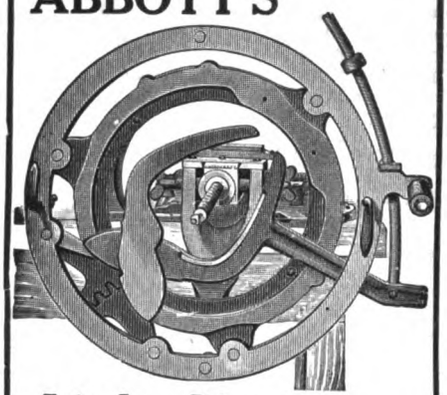
For All Mowers or Binders



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THE WHITAKER MFG. CO.
CHICAGO

ABBOTT'S



Little Giant Hub Borers

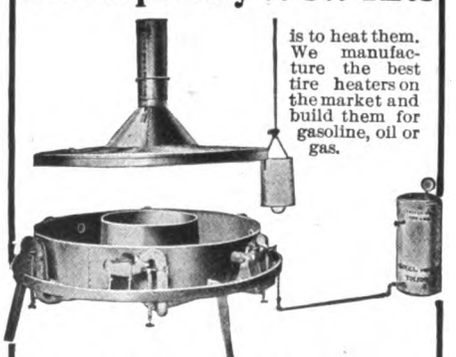
AND Abbott's Box Puller

Made by ABBOTT & CO., Hudson, Mich., and sold by all Dealers in Carriage Makers' Machinery.

PHINEAS JONES & CO., Newark, N.J.

General Agents for the Eastern States

The Proper Way to Set Tires



is to heat them. We manufacture the best tire heaters on the market and build them for gasoline, oil or gas.

ASK YOUR DEALER

to tell you about our goods and write for booklet describing fully tire heaters,- full circle center King Bolt and Rear King Bolt, 5th Wheels, Body Braces, Flare Board Irons, End Gate Springs, and Blow Pipes for brazing rubber tire wires.



Write for Booklet.

GOGEL MFG. CO.,
Toledo, Ohio.

"TOOLS THAT WEAR" **HELLER'S** CELEBRATED AMERICAN HORSE RASPS, FILES AND FARRIER'S TOOLS

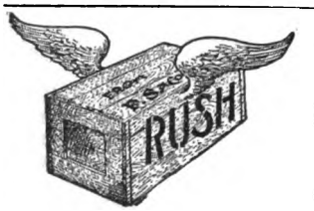
will save you Time and Money. Their Superior Quality sets a known and tested Standard of Excellence. All made from our own Production of Special Refined Cray Crucible Steel and Tempered by a Secret Process.



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New Catalogue Mailed Free on Application.

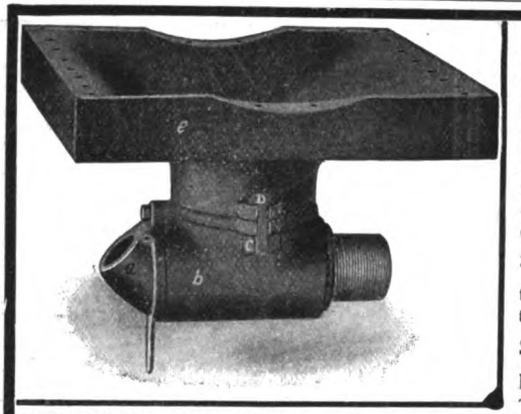
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FELTON, SIBLEY & CO.
Manufacturers of Colors, Paints, Varnishes
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The Vulcan for Tuyere Iron Has no Equal.

Are winning their way on the strength of **real merit.** New design based on long experience. Rapid heater and will not crack as others do. Cast in one piece. Automatic vent alone is worth price of Tuyere. Steadily increasing sales is proof that Blacksmiths know a good thing when they see it.

Send for Booklet, **"Some Forge Troubles and How to Avoid Them."**

HOOSIER FORGE CO., Connersville, Ind. CHICAGO OFFICE, 1121 Stock Exchange Building.



THE PERFECT POWER HAMMER

Made in 3 sizes.

Only one horse-power to run it. The best Trip Hammer in the U. S., by reason of its simple construction, efficiency and durability. Used exclusively by some of the largest carriage builders in the country.

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Always the same report.

"PIKE CORUNDUM WHEELS

are the best for Foundry use and Tool grinding. Cool, free and fast cutting." Made of highest grade Corundum obtainable. Every user of a Pike Corundum Wheel is insured against accident by the Casualty Company of America. **Send for new illustrated Catalog.**

PIKE MANUFACTURING CO.
PIKE, N. H.

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ARE YOU ?

Any shoer who is willing to talk with his customers about the value of pads (and there are plenty of good things to be said about them), and who will make it a practice to use only the kind of pads that will BACK UP his pad-arguments, can soon work up a hustling pad business—and a hustling pad business is a splendid thing for a shoer's bank account.

MORGAN & WRIGHT PADS

are used EXCLUSIVELY by many shoers who are making a specialty of the pad end of their business, and these shoers are getting the PAD PROFITS in their towns.

It's a matter of GOOD pads and PUSH.

Get a sample order of our pads from your dealer and "get into the pad game."

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THE LEADER
OF THEM ALL
KERRIHARD'S
POWER HAMMER



Specifications of NO. 1 KERRIHARD HAMMER
Height over all 55 in.
Floor space 18x30 in.
Heig't anvil block 31 in.
Weight of ram 30 lbs.
Shipping weight of hammer 700 lbs.
One H. P. to operate.

Specifications of NO. 2 KERRIHARD HAMMER
Height over all 60 in.
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Heig't anvil block 31 in,
Weight of ram 75 lbs.
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A first-class machine sold at a low price. Contains every modern feature. Strongly built of the best material. Will do your work easily and quickly and will do it right.
MADE IN TWO SIZES.

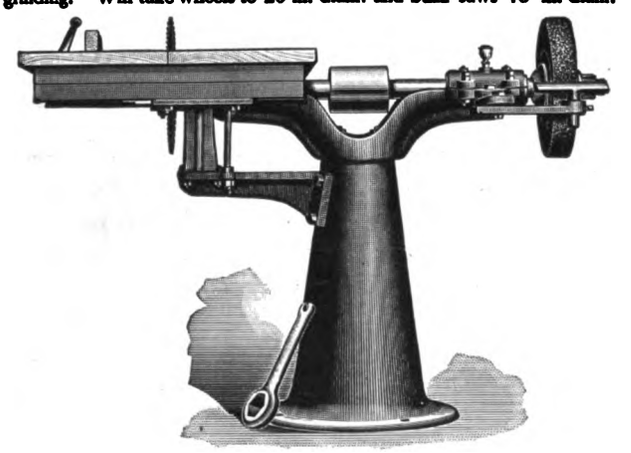
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Fitted with Sawing Table and Frame.

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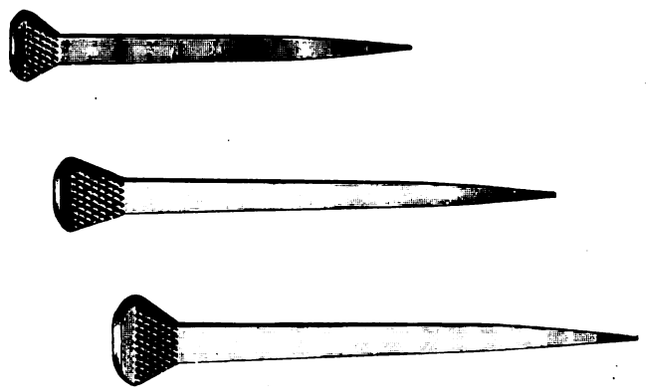
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CAPEWELL HORSE NAILS

POSSESS QUALITIES

Which make them by far the easiest driving nails and the most suitable nails for all classes of work. Horseshoers throughout the country know this to be the fact; and in measure it explains why there are more "Capewell" nails sold in the United States today than of all other brands combined.

MADE IN ALL STYLES AND SIZES.



CAPEWELL NAILS

Have the Keenest Points and the Strongest Blades.

Are Easiest to Clinch but so tough that they will not break at the Clinch.

Smaller sizes can be used than of other brands because of their Superior Strength.

The Most Satisfactory and the Most Economical Horse Nails in the World

The Verdict of those who use them

MADE BY

THE CAPEWELL HORSE NAIL CO.
HARTFORD, CONN.

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KEROSENE ENGINES
GAS, OIL and ALCOHOL
Stationary, 1 to 150 H. P.
Marine, 1 to 120 H. P.
Over 30,000 in operation.
Safe, Reliable, Economical
Send for Catalog,
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Now made of high carbon steel.

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Guaranteed to be stronger and more rigid than solid steel axles. We make both. Write us

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Cushion Backs, Storm Fronts, Poles & Shafts.
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WITH 4-IN. TIRE STEEL WHEELS
Our wagons are well ironed throughout—wheels made with round staggered spokes.



We make any size wheels to fit any skein.
We manufacture a complete line of metal wheels for corn planters, cultivators, plows, etc.
WRITE TO **C. BUSH, QUINCY, ILL.**
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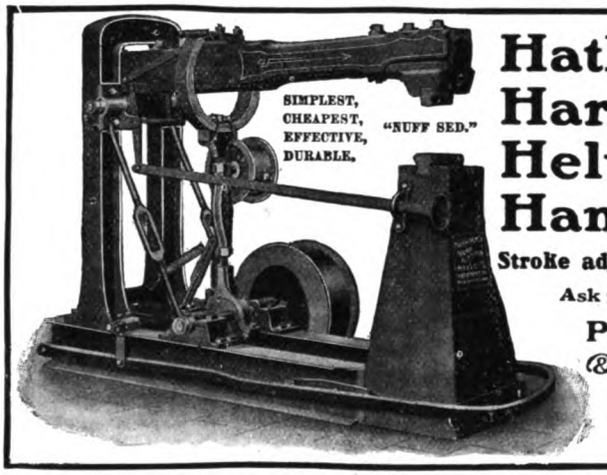
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For Plow Work, Wagon Work, Heavy Work, Any Work.
"The BOSS power hammer that I bought of you has given the best of satisfaction."
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New York.
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A wheel that will do the work in one-fourth to one-half less time is by far the cheapest in the long run. A wheel that will save only one hour per day during your busy season would pay for itself in full.





NATIONAL SAFETY SHORT-TURNING FIFTH WHEELS
have been on the market for over **TEN YEARS**
and used by good Carriage Builders everywhere. Ask your dealer for them. If he can't supply you, **write for catalogue** showing all our different styles.
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Stroke adjustable while running.
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They're made of stuff that cuts
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Sizes, 1½, 3, 4½ H. P. Vertical. 5 to 25 H. P. Horizontal. Either tube igniter or electric igniter. Shipped mounted on skids, if desired for farm use.

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Crank Turns Forward or Backward.

Noiseless and Easy to Operate

Gear case is oil-tight and dust-proof. Gears run in a continuous bath of oil.

Gears are Phosphor Bronze and Steel, flat and straight cut. No Spiral or Worm Gears.

Fire-pot is 8x9½x4 inches inside.

A powerful blast; lasting after blast

Fan, 12 inches. Height, 47 inches. Weight, 135 pounds.

Can be furnished to operate with the right arm, for left-handed smiths, when desired.



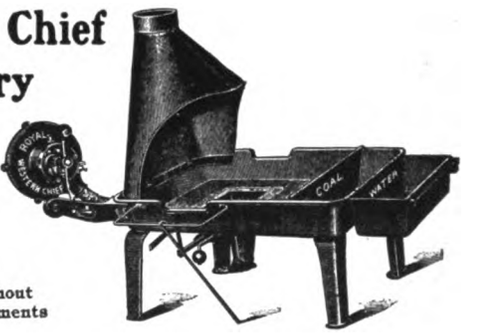
Royal (Western Chief) Forge No. 100

For use of Large Blacksmith, Wagon, Plow, Railroad Shops, Etc., where Heavy Work is Done, and a First-class Forge and Fire Are Needed.

Fan, 12 Inches.
Height, 30 Inches.
Weight, 300 Pounds.
Hearth, 31¼ x 45¼ Inches.
Length Over All, 83 Inches.

In this Forge we combine our "Royal" style of Blower with Western Chief Standard Hearth, having Solid Fire-pot with Tuyere Ball Furnishing side and center blast. We guarantee it fully.

Western Chief Stationary Forges



Six Different Styles

With or Without Blower Attachments



ROYAL FIRE-POT

Needs No Clay

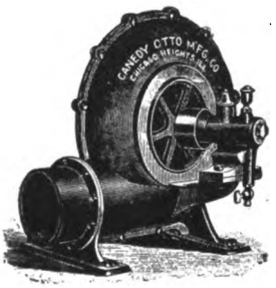
Dimensions 8 x 9½ 4 inches inside

Tuyere Iron

Write for catalogue describing our full line of

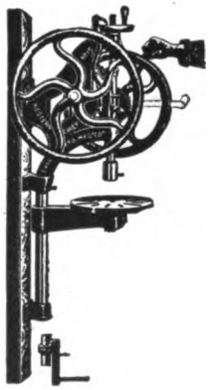
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For sale by first-class dealers all over the world.

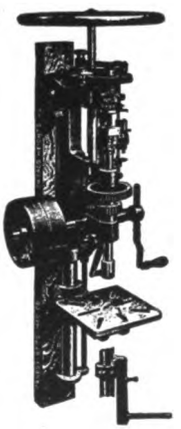


Western Chief Power Blowers

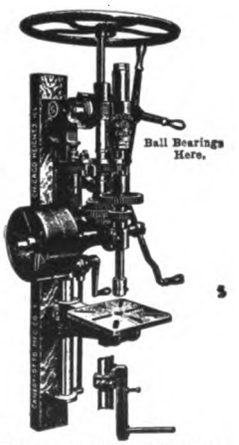
Built in sizes suitable for from one to seven fires



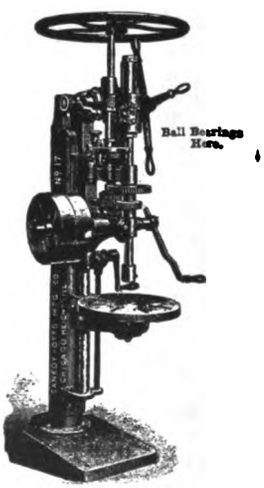
No. 15 WESTERN CHIEF DRILL.
Automatic Self-Feed.
19 in. Circle.



No. 14 WESTERN CHIEF DRILL.
Automatic Self-Feed, and the only AUTOMATIC Quick Return Post Drill Made. 21 in. Circle.



No. 16 WESTERN CHIEF DRILL.
Automatic Self-Feed and Hand Lever Feed. Largest Post Drill Made. 24 in. Circle.

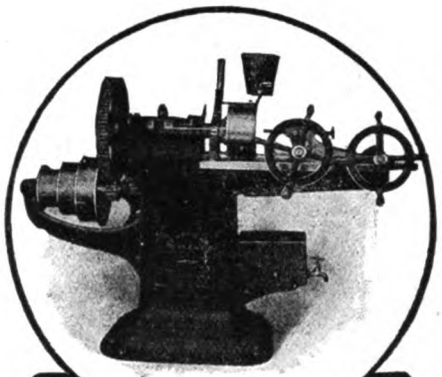


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Automatic Self-Feed and Hand Lever Feed. 24 in. Circle.

MADE BY **CANEDY-OTTO MANUFACTURING CO.**

CHICAGO HEIGHTS, ILLINOIS

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FRONT VIEW

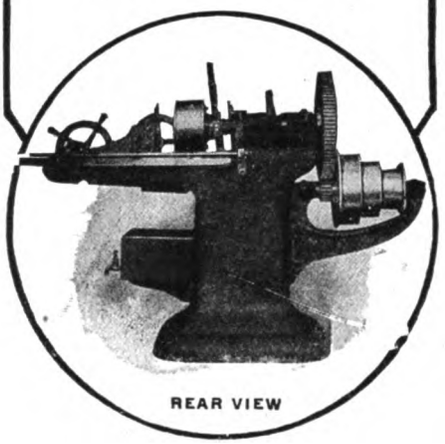
A Bolt Cutter is much like a man in this: THE HEAD is nearly everything.

The Merriman Bolt Cutter Head is Noted for—

1. SIMPLICITY OF THE HEAD: Only Four Parts, consequently,
2. GREAT DURABILITY. Few repairs needed.
3. SQUARE BEARING OF THE DIES IN THE RING; consequently,
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Finest Quality Material
Largest Variety of Shapes—Easy to Fit
Superior Creasing and Punching
Uniformity in Finish

These are only a few of the Special Points that make

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HORSE AND MULE SHOES
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Our line of shoes is the most complete on the market
We carry all styles and sizes and every shoe carefully made

DESCRIPTIVE BOOKLET FREE—WRITE FOR ONE
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Rolling Mills at Poughkeepsie, N. Y. and at Joliet, Ill.

—ADV. DEPT. AMERICAN BLACKSMITH

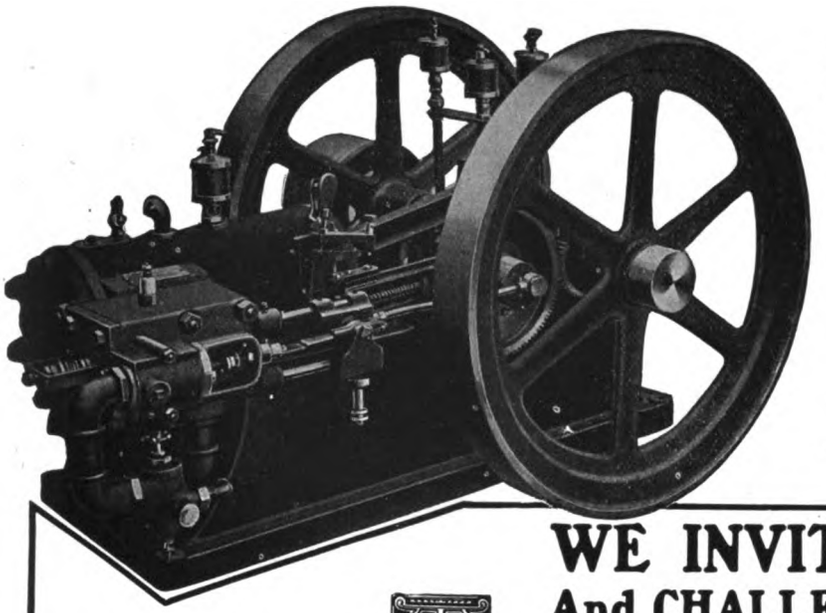


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TRENTON

It's the Best Anvil Made.

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Always Ready to Start.

No Engineer Required.

No Increase in Insurance by their use.

WE INVITE INSPECTION
And CHALLENGE COMPETITION

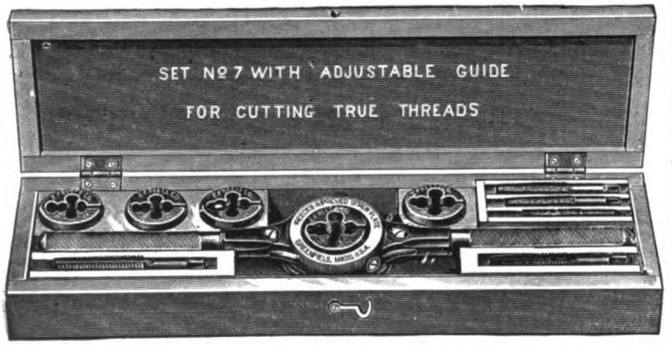
OUR "GIANT"
4 H. P. Engine
The Best on the Market for the user of small power. Write for details.

WILLIAMSPORT ENGINES are constructed by the most skilled workmen, and only the very best material used. We offer you an Engine of the Finest Quality, noted for its Simplicity, Durability, Ease of Operation and Beauty of Design. Our broad Guarantee covers all.

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"REECE" SCREW PLATES
With Patent Adjustable Guides

No. 12 Reece Screw Plate with patent adjustable guide stock and 5 sizes taps and dies, ¼, ⅜, ½, ⅝ and ¾ ins., complete in case, **Special Net Price, $7.87. Or**

No. 122 Reece Screw Plate, same as No. 12 set, with Hercules Adjustable Tap Wrench included (see illustration of tap wrench above), **Special Net Price, $8.72.**

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If he cannot supply you, write us direct

NO BETTER SCREW PLATES MADE THAN THE CELEBRATED REECE KIND

Our illustrated catalog is sent free. Write today.

THE E. F. REECE CO.
GREENFIELD, MASS. U. S. A.

Little Giant

COMBINED

Punch and Shear.

The Most Powerful Lever Punch and Shear Made.

5 Punches and Dies with Each Machine.

MADE IN THREE SIZES.

No. 1—Will punch ⅝-inch hole in ½-inch iron. Cuts iron ⅝-inch thick and 1-inch round. Weight, 515 lbs.

No. 2—Will punch ½-inch hole in ½-inch iron. Cuts iron ½-inch thick and ⅞-inch round. Weight, 350 lbs.

No. 3—Will punch ⅜-inch hole in ⅜-inch iron. Cuts iron ⅜-inch thick and ¾-inch round. Weight, 280 lbs.

Only ONE operation of the Lever does the work. No changing required.

Note the improved Stripper and Hold-down. This machine is made for the blacksmith shop, and we DO claim that it is decidedly the best on the market for that place.



For Sale by your Jobber. If not, Write Us. Send for Circular.

Little Giant Punch & Shear Co., Sparta, Ill.

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In the Natural State

the hoof of the horse comes in contact with Mother Earth and is perfectly bare. This condition permits free access of natural moisture and fresh air to the frog and other parts of the hoof and the hoof being bare, the frog can expand.

For the horse in service it is necessary to protect the hoof from contact with hard roads, and the closer we can stick to nature and yet give the necessary protection, the better for the horse.

Of all hoof protections the "W & B" Rubber Pad Shoe is undoubtedly the best because, being open, it does not cover the hoof, but permits the natural moisture and fresh air to reach the frog and other parts, keeping the hoof healthy, and as the heavy rubber pads at the heel are resilient, and the shoes do not cause the frog to contract, but rather allows it to expand as nature intended.

The protection is ample, as the frame of the shoe is drop forged from steel, and the channels, both upper and lower, are filled with high grade rubber, thoroughly vulcanized.

The "W & B" Rubber Pad Shoe is fitted cold and applied much quicker than the iron or steel shoe; therefore the shoer increases his profit by using it.

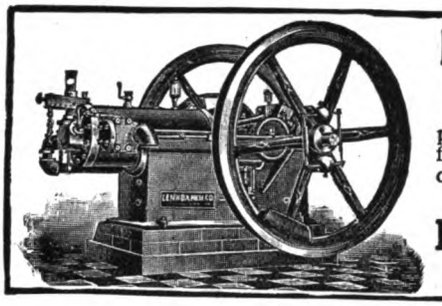
Carried in stock by all of the leading Blacksmith Supply Houses.

If your jobber does not carry it, write us.

The Whitman & Barnes Mfg. Co.

GENERAL SALES OFFICE,

CHICAGO, ILLINOIS



Lennox Gasoline Engines

MADE IN ALL SIZES.

Built especially for **Blacksmith shop** power. It means money in your pocket to find out about our engines before placing your order.

WRITE AT ONCE FOR NEW FREE CATALOGUE.

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9 to 15 in. Swing. New Features.

SEBASTIAN LATHES are Good Lathes

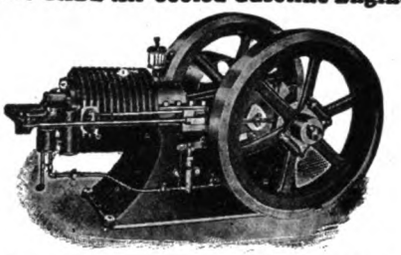
Catalogue Free. Sizes 9, 10, 13, 15 Inches.

Our engine lathes are provided with both screw and rod feeds as well as power cross feed. Gears to cut all standard threads from 5 to 36 are furnished. Steady and follower rests, large and small face plates and countershaft go with each Lathe. **Foot Lathes, Tools and Supplies.**

SEBASTIAN LATHE CO.

124-126 Culvert Street, CINCINNATI, OHIO.

The GADE Air Cooled Gasoline Engines



Made in 2, 3 and 6 horse power sizes. What's the use of paying good money for an old style engine, when you can get something better in the "**Gade Air Cooled**" at the same cost Buy one. It will not freeze up or go back on you in cold weather. It's ready for business all the time. We know it will please. By all means write for descriptive circulars and price list of the "Gade." Address, **GADE MFG. CO., Iowa Falls, Iowa.**



COATES ELECTRIC CLIPPER

Clip your horse and sharpen his toe calks with the same machine. Move the light clipper around, no need to move the horse. You should know all about **Coates Flexible Shaft Machine.**

Send for Book A. B.

COATES CLIPPER MANF'G CO.,

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Will turn off blue chips on any kind of work.

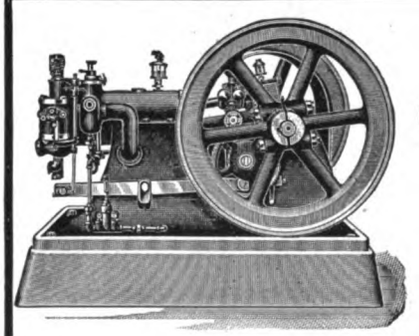
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PITTSBURGH.

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THE ALAMO GASOLINE ENGINE

The ideal power for shop or farm. Economical of fuel. Easy to start. Speed regulated while in motion. Built on advanced lines. Satisfactory wherever installed. Send today for Catalog A—FREE—full of information.

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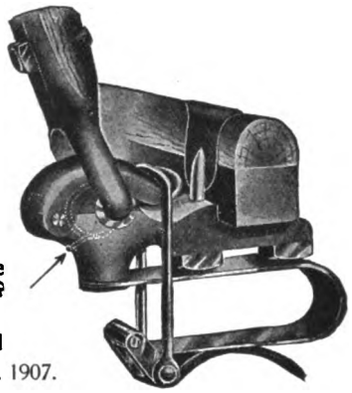
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ECCLES BALL-BEARING COUPLINGS

With Leather Bushings in one piece, securely fastened in the socket of the Coupling.

When the shafts are removed, the bushing does not come out, but stays in the Coupling where it belongs. NO LOST BUSHINGS WHEN YOU USE OUR COUPLINGS.

We would like to send you our circular and have you try our Couplings. They will save you money.



Patented June 11, 1907.

Patented Nov. 25, 1902.

The Spring is pivoted at the front so that it can be turned forward out of the way of the wrench while clipping the Coupling to the axle.

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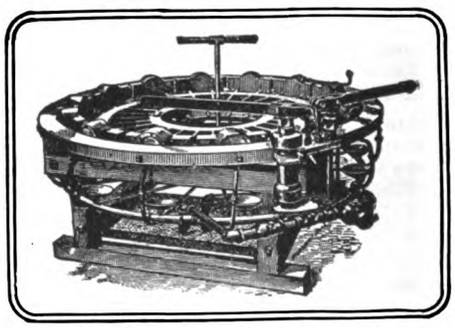
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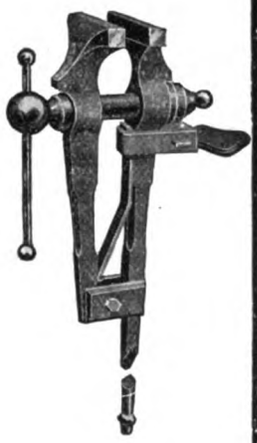
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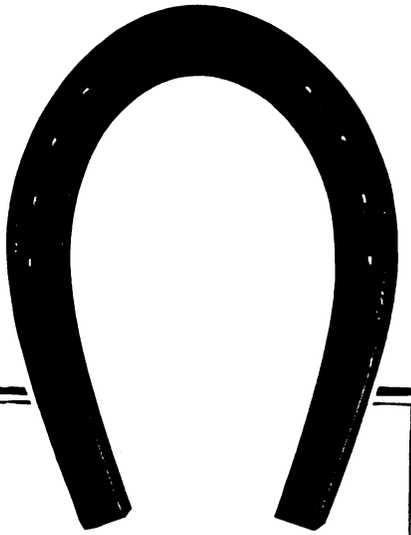
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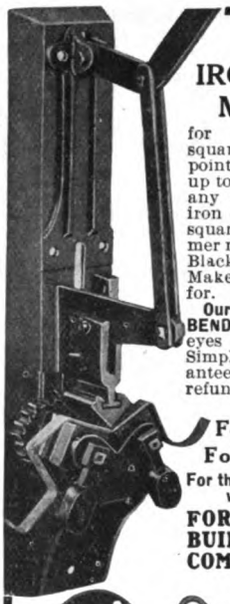
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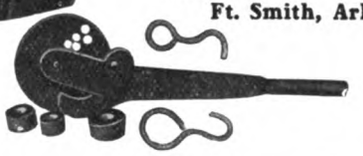
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The Classified Buyers' Guide will be found on pages 40 and 41 of this issue. Whenever in need of anything, it will be to your best interests to write the parties listed there. Be sure to mention The American Blacksmith when you do write.



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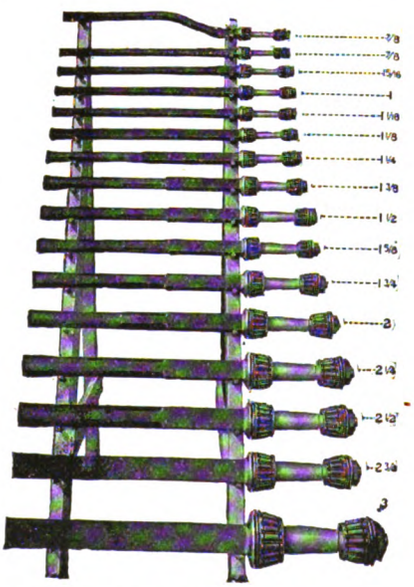
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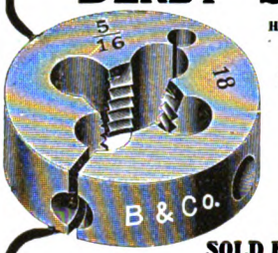
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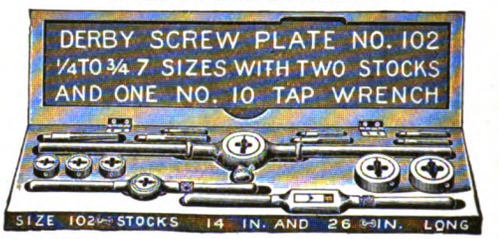


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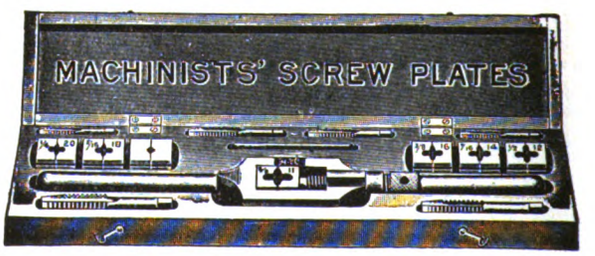
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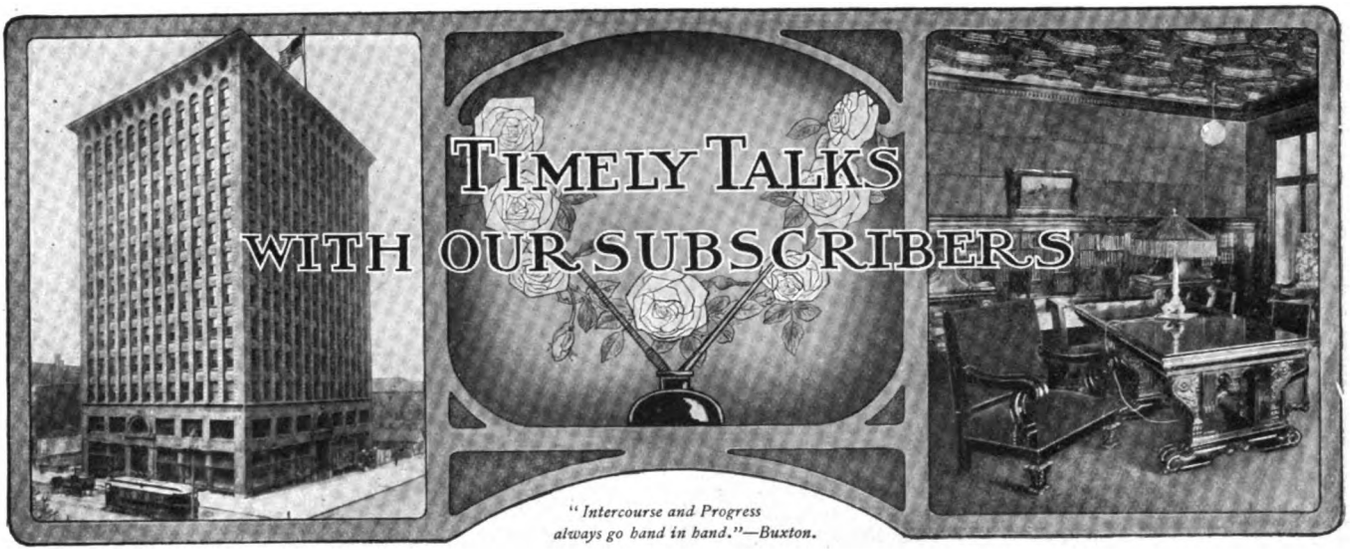
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Contents, August, 1907.

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Don't hesitate to make suggestions for the betterment of "Our Journal." If we have missed our aim we want to know it. If we have pleased you it would be equally pleasant to know about it. The paper is published for your benefit, and only by getting your ideas and by receiving your suggestions can we hope to reach the ideal of what a smithing paper should be.

"I haven't time to read the journal," wrote a Pennsylvania smith the other day. No time to improve—no time to increase my knowledge of the craft—no time to learn how to save time—no time to find out what my brothers are doing—no time to keep my knowledge of the trade alive and growing—that practically is what this smith said when he wrote, "I haven't time to read the journal." We have all heard about the man who could spare no time from his business to care for his health but who necessarily had to take time when he was dangerously ill. Better to take a few minutes each day for health than a week or a month for illness. 'Tis better by far, and easier, too, to keep a business alive and growing than to rebuild one that has begun to slide backward.

A few minutes each day devoted to craft-reading will enable you to keep your business alive and growing. It will enable you to keep abreast of the times. Some smiths, and this Pennsylvania smith in particular, think that time spent in reading a craft journal is lost. When you are tempted to figure this way, think of what THE AMERICAN BLACKSMITH has done for you. Think of trying to carry on your business without knowing what your brother craftsmen are doing. Think of learning a trade and then trying to be successful in it without being in close touch with that trade. Time spent in reading good craft literature is an investment. If you haven't time to invest, take time, make time. A smith should certainly be willing to invest time when that is all that is required to keep him in close touch with his brother craftsmen, to increase his craft knowledge—to learn how to save time—to keep his knowledge of the craft alive and growing. A few minutes each day, spent in strengthening your business health, will insure you against business ills of the future.

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"I THINK WOMEN, IF THEY ARE HEALTHY, CAN ;DO MANUAL LABOR THE SAME AS MEN, AND, WHILE I AM NOT AS STRCNG AS ;FATHER, I CAN SHOE A HORSE AND BUILD A WAGON ALL RIGHT."

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A Sixteen-Year-Old Girl Smith

Labors at the Forge and Handles Horses Like an Old-Timer



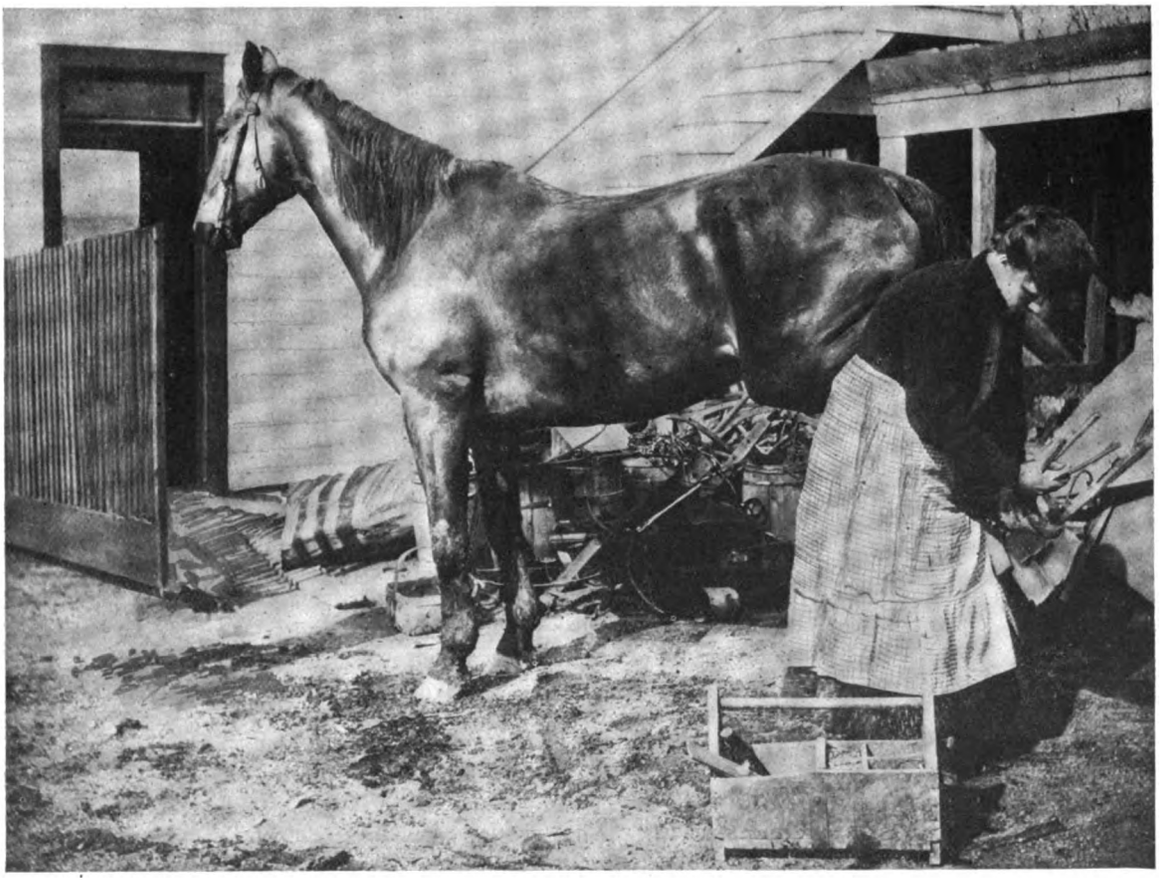
CONSIDERED the equal of any smith in the locality, and with an ambition to become one of the greatest smiths in the United States, Miss Minnie Hagmann, of Missouri, works beside her father's forge at shoeing horses and building wagons. She is thoroughly familiar with the smithing trade, and, despite the natural weakness and timidity of her sex, she labors at the forge and handles horses like one long accustomed to the work.

Miss Hagmann's experience as a general smith began some three years ago, when her father, Lorenz Hagmann, purchased a shop of his own. Being forced into debt and unable to afford a helper, his daughter volunteered as his assistant. She soon learned how to forge simple things, and gradually picked up a knowledge of the more difficult branches of the trade, until now she not only forges the shoe which she puts on the horse, but she is able to make any part of a buggy or wagon. She is justly proud of her ability at the forge, and is pleased to show visitors examples of her work. Her father considers her superior to the average general smith, and says he would rather have her about than a hired man. The girl is very much interested in her father's business, and not only assists in the shop, but also takes care of the books and collects the bills.

"I would rather work in the shop with father than do housework," said Miss Hagmann. "I am always healthy, and feel good all the time. When we are not busy at the shop I help mother, and on Sundays I have a chance to rest and to go to church and Sunday school. I like the work and do not want to leave it. I have been around smith shops ever since I can remember, and since I've been at the trade I have taken a great liking to the work. I think women can do manual labor the same as men if they are healthy, and, while I'm not as strong as father and cannot lift the weights he can, I can shoe a horse and build a wagon."

Miss Hagmann says she is not anxious to marry. "You see, there are so many fellows that can't make a living themselves that I would be better off single than married to one of them, for I have a trade and could always make a living. Lots of people are surprised at my working as I do, but it is natural for me to be helping my father. Housework is all right for girls, but I would rather work in the shop, for housework is almost as hard. And then when a person does not like certain work it seems harder than it really is."

This girl smith can swing a sledge, pick up a foot and fit a shoe like an



"IF YOU BEAT HIM, YOU MUST EXPECT A KICK. HORSES ARE LIKE MEN; WHEN THEY ARE TREATED RIGHT THEY WILL ACT RIGHT"

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old-timer. She has never been injured by a horse, and has no fear of the animals. She does not believe in using the whip, and says that the friendship of a horse, no matter how vicious, can be gained through kindness. She says, "The only way to get the good side of a horse is to be decent with him. If you beat a horse you must expect to be kicked, for horses are like men and when they are treated right they will act right."

The girl smith is well known through the county, and all the farmers having dealings at the shop always have a good word for her as she toils beside the forge.

We are indebted to the *St. Louis Republic* for the photographs here reproduced.



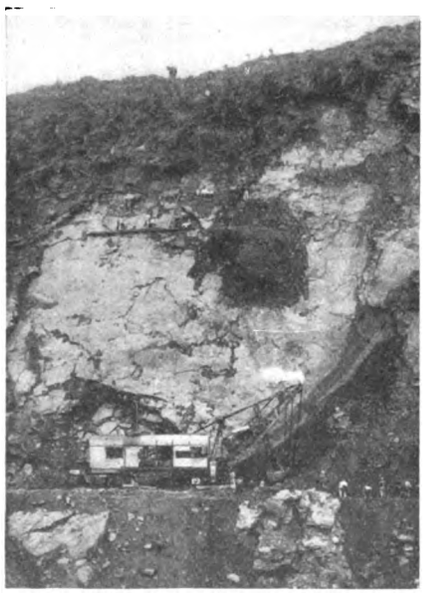
MISS MINNIE HAGMANN, OF ST. LOUIS, THE GIRL SMITH WHO SHOES HORSES AND BUILDS WAGONS

The Use of Alcohol and Gasoline in Gas Engines.—4.

C. E. LUCKE AND A. M. WOODWARD.

Elementary Engine Mechanism.

Every exploding engine operating with crude oil or its distillates, or alcohol, must have certain parts, no matter how different engines may vary in other details. These parts are a cylinder, in which a sliding plug, or piston, works back and forth, carrying a pin called the wrist pin, to which is fastened a connecting rod, the other end of which fits into another pin called a crank pin. This crank pin is at one end of an arm called the crank, on the other end of which is the shaft, or crank shaft. The piston moves back and forth in the cylinder, but when nearest the cylinder head there is still some space left between the walls, valves, and the piston head. This space is called the clearance, or the explosion chamber, and is the space in which the charge is compressed before it is exploded. In the clearance walls or cylinder head there are two valves in the form of disks, which cover the openings, or ports. Through one of the valves an explosive mixture is admitted from the source of fuel supply and from the air. Through the other valve the products of combustion after an explosion are expelled. Their duty gives these valves the names of inlet and exhaust valves, respectively. Four strokes are usually required to complete the cycle of events occurring with the cylinder, and to engines requiring these four strokes the name four-stroke cycle, or four cycle, is given. There are certain other engines with different valve arrangements, which may complete a series of operations in two strokes, and these are called two-cycle engines.



AT PANAMA—SHOWING A STEAM SHOVEL IN OPERATION. AN IDEA OF THE WORK BEING DONE ON THE ISTHMUS MAY BE GAINED FROM THIS PICTURE

The series of operations requiring four strokes is best illustrated by a set of diagrams. In figures 1 to 4 is shown a cylinder with the parts connected to it. On the first stroke, or outstroke (Fig. 1), the piston is drawn forward either by hand when starting or by the action of fly wheels after the engine is put in motion. This moving forward of the piston is accompanied by an opening of the inlet valve, permitting the explosive mixture to follow the piston and fill the cylinder. The clearance space, before this suction stroke begins, is filled with burnt gases from the previous explosion, so that the amount of mixture drawn in will be equal to the volume displaced by the piston, and this fresh mixture will be mixed with some burnt gases. At the end of suction the inlet valve is closed and compression begins (Fig. 2), continuing through the second stroke. During this process both valves are closed, and the fresh charge, together with the residue of burnt gases, is squeezed into the clearance space so that it will have as a result a considerable pressure, called the compression pressure, preparatory to exploding. At the end of compression an electric spark explodes the charge, causing the pressure to rise two to four and one half times the compression pressure. This high pressure in the clearance space will then drive the piston forward. This stroke, the third, or outstroke (Fig. 3), is accomplished by the high pressure of the gases filling the explosion chamber, and during the progress of the piston the pressure gradually falls as expansion takes place. During this time both valves are closed, as during the compression. At the end of the expansion (Fig. 4) the exhaust valve opens and the piston returns under the influence of the fly wheel, which has been spun around by the explosion, giving the fourth stroke, or instroke. The exhaust valve being open for this stroke, most of the burnt gases are expelled, but some are retained in the clearance. After this the fifth stroke begins, which is the same as the first stroke, and subsequently the whole series repeats itself indefinitely and automatically.

While the above operations are usual and the above parts are likewise important, an engine having no more mechanism than is shown would not run. There will be required in addition to what is shown a valve gear, which is a mechanism for opening and closing the valves at the proper time. There must be also some device for making a mixture having the proper

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characteristics for explosion. This mixture will consist of air and the vapor of the liquid fuel, so that there must be supplied a carbureter, which vaporizes and mixes at the same time, or a vaporizer which vaporizes without mixing. There must also be a mechanism for automatically producing an electric spark at the proper time. This constitutes an igniting gear. The explosions will heat the cylinder so much that a lubricating oil will burn and the piston stick; therefore some cooling device must be supplied, generally in the form of a jacket surrounding the whole cylinder and containing water. If the engine is to do stationary work it must operate at a constant or nearly constant speed, regardless of the amount of work done. This requires a governor. The explosions are very loud; therefore such engines are equipped with a "muffler" to lessen the noise. The rubbing parts, viz., the piston, the main bearings, and the crank shaft, wrist pin, crank pin, valve gear, igniting gear, governor, etc., must all be lubricated to prevent overheating and undue wear, so that a lubrication system is required.

Different makes of engines differ in the above details. All have some provision for performing what is pointed out as necessary, and it is here that inventors and engineers exhibit their skill. All of these engines work as a result of the combustion of the explosive mixture of vapor and air, and a proper understanding of how the various styles of mechanism or changes in detail may affect the engine requires a preliminary knowledge of their effect upon the explosive mixture.

Explosive Mixtures.

It is easy to understand how an engine may operate without understanding the well-known facts concerning explosive mixtures; but it is impossible to comprehend why engines should differ in fuel consumption or horse power, good regulation, or any other characteristic without first studying in detail the influence of the mechanism on the composition of the explosive mixture.

Any fuel will burn when there is oxygen present in proper quantity and when the fuel has previously been heated sufficiently. This is true for any kind of combustion, such as the burning of wood, coal, oil in a lamp or cook stove, or gas issuing from an illuminating jet, as well as mixtures in exploding engines. When a fuel is mixed with air containing the right amount of oxygen, or mixed with any solid or liquid containing oxygen in the right amount, then explosive combustion is possible. If such a mixture be ignited at one point by heating it by a flame, a hot plate, or an electric spark, the combustion will travel through the entire mass of its own accord. Otherwise stated, the combustion will be self-propagating. When a mixture has this property of self-propagation of combustion, it may be said to be explosive, whether the propagation be fast or slow or whether the explosion be accompanied by noise or not. Gunpowder consists of fuel in the form of carbon or charcoal, together with a little sulphur and a salt, such as a nitrate, containing oxygen. A long train of powder will completely inflame itself if lighted at one point. If the powder be of good quality and pure, the flame will propagate very rapidly. If, however, the powder have some sand or dirt mixed with it, the flame may still propagate, but more slowly, and finally, if there is too much dirt or inactive material present, it will be impossible to ignite the whole mass by self-propagation. Engine mixtures do not consist of solid fuel, like gunpowder, with oxygen in the nitrate form, but, on the contrary, consist always of gaseous fuel or liquid fuel vapor mixed with air. The combustion of gaseous mixtures is very much the same in nature as the combustion of gunpowder, which is not thought of as a mixture, but which really is. If a mass of explosive mixture be contained in a vessel or in a

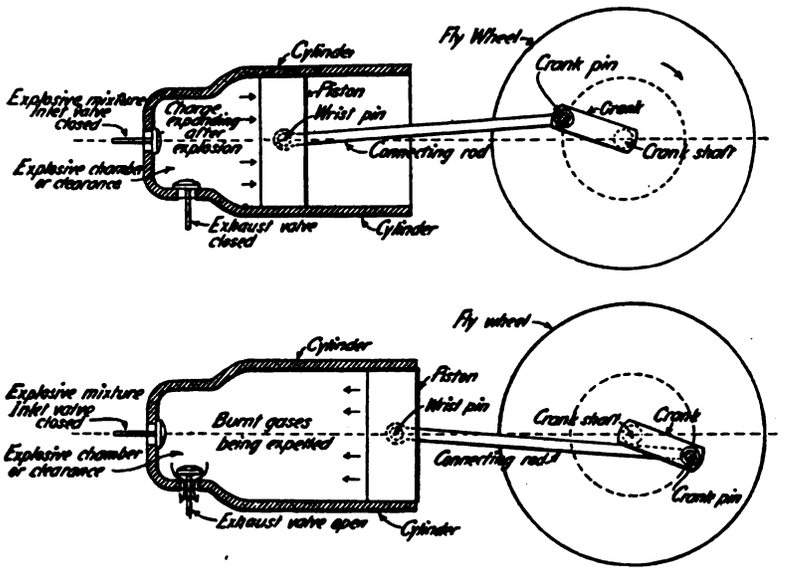


FIG. 3—SHOWS THE PISTON BEING FORCED OUT AFTER THE EXPLOSION
FIG. 4—SHOWS THE PISTON RETURNING TO EXPEL THE BURNT GASES

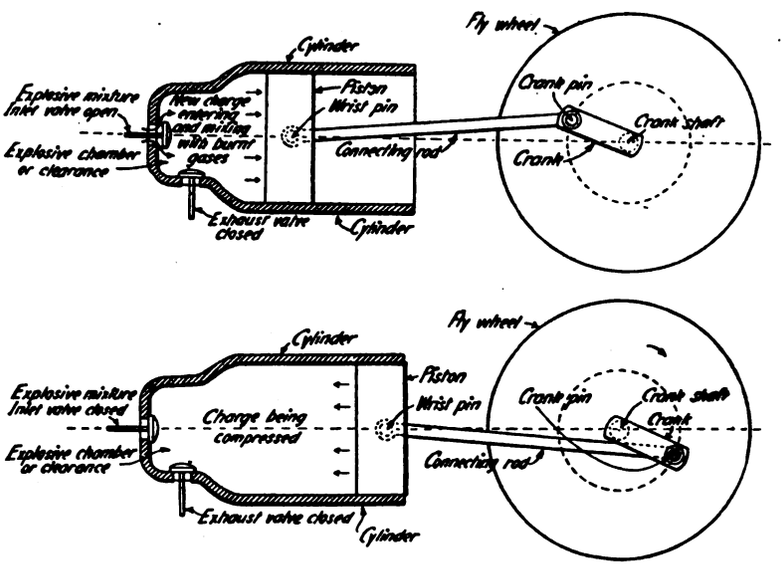
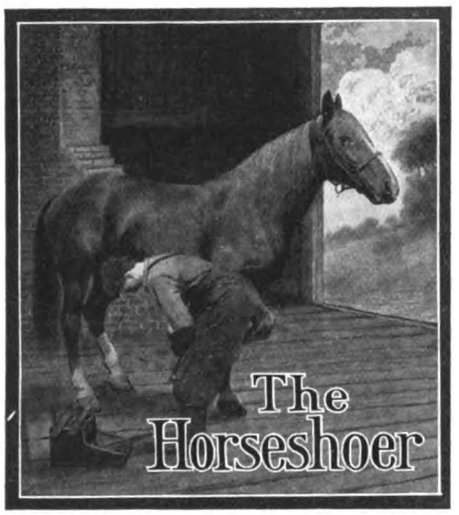


FIG. 1—ILLUSTRATES THE OPERATIONS DURING THE SUCTION STROKE
FIG. 2—ILLUSTRATES THE HAPPENINGS DURING THE COMPRESSION STROKE

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glass tube and be ignited at one end of the tube, the eye can distinctly follow a flame traveling through the tube. The entire tube does not show a flame at any one time, but instead it will be found that the flame is in the form of a disk, or cap, and that this flame cap travels through the tube, the flame cap being blue in color, with slight variations. When it has traveled past a certain point all mixture between that point and the place where the combustion started is burnt, and all the mixture beyond the flame cap is still unburned.

(To be continued.)



Horses and Horseshoeing.

W. O. JULIUS.

It is admitted by all that, while 90 per cent of the diseases of the horse are of the foot and leg, and all due to shoeing, horseshoeing is absolutely necessary. One authority puts the deaths from pricking alone at 60 per thousand. Still the horse would be practically worthless without shoes, and the evils resulting from the operations of shoeing may be fairly described as accidents. It is, however, the aim of the farrier to prevent accidents in shoeing as much as possible.

A writer in an agricultural paper calls attention to the fact that Arabian horses seem young at thirty-six in their own land, where shoeing is unnecessary. He also says that a horse in a country where shoeing is necessary is often worn out before he is a quarter the age the Arab's steed normally attains. Of course, the blame is all laid to shoeing. But how much earlier would our animals be classed as useless if they were worked unshod! How soon would the feet become misshapen, the knees bent, and the legs lumpy! We must also consider that the Arab cares for his horse as the animal is cared for in no other country, while here the animal is perhaps the most abused of any, considering the part he plays in commercial life. It is also admitted that the hard pavements of our cities soon wear out the animal's feet. This latter, however, could perhaps be in part alleviated by careful driving and proper shoeing.

Proper shoeing—what is it? How can we attain the ideal? Those are the questions the shoer must answer. Care alone won't do it—knowledge must be the foundation of ideal shoeing—knowledge of anatomy, and of the particular case under consideration. The ideal shoe would be one that attaches to the foot by other means than by nails. It must not bind the foot, but must allow it to expand freely. It must allow for frog pressure. It must be of material that can be readily shaped to the foot and that will wear well. But until some inventive genius comes forward with a shoe of this kind, careful shoeing based on a knowledge of horse anatomy will be the best we can do for our friend the horse.

The farrier who makes a study of anatomy need never go begging for trade. There are plenty of horse owners in every community who, instead of narrowly seeing the dime of the present think broadly of the dollar of the future. Altogether too often does the price charged or the distance to the shoeing shop influence the choice of shoeing smiths. But happily the public are becoming educated to the idea that there are shoers and shoers. The better class of shoers has educated the horse owner to the right idea of the subject. He has shown him that a 20-cent saving in the shoeing bill may mean twenty dollars' worth of veterinarians' bills, and in time and labor lost.

A better and broader knowledge of horse anatomy is what the smith needs—is what the whole craft needs—a better understanding of the principles underlying the shoeing art. Then will the craft be lifted, then will prices be what they should be, then will the farrier come again into his own.

Proper Shoeing Requires Proper Knowledge.

ALVA PRIMMER.

There have been a great many inquiries in "Our Journal" lately about how to stop this, that, and the other thing in a horse's foot. First it's interfering, then it's corns, and after that something else. Now, as to interfering, I think this trouble is mostly caused by the shoer who doesn't know all he should about the horse's foot. He doesn't know anything about the animals' foot except what he sees. He knows nothing about the inside structure of the foot, the way to balance the foot or make the horse go straight. Oftentimes he doesn't even know how to drive a nail properly—how to attach the shoe without pricking the horse and laming him or permanently injuring him.

Referring to corns, their cause and cure, would say that pressure causes all the trouble. If you prevent pressure you prevent corns. Gravel, stones,

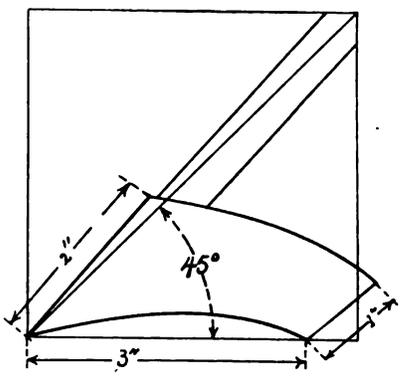


DIAGRAM SHOWING HOW TO PREPARE A HEALTHY FOOT FOR SHOEING

and small rocks may cause corns by becoming imbedded in the hoof and thus pressing upon the bottom of the foot. Corns may, however, be caused by poorly fitted shoes, and this is very often the case. I have come across many cases where the shoe was lower on the inside than on the outside. This, of course, means a sore spot, and by and by a corn, and finally a ruined foot.

A question was asked a while ago as to whether a horse that had never been shod could have corns and interfere. I have come across cases of both interfering and corns under these circumstances. Corns may be caused in this case by gravel adhering to the mud in the horse's foot and thus causing pressure. As to interfering, this is caused by the horse's feet getting out of shape. Especially young horses are liable to this trouble, and when the feet are misshapen interfering may easily happen.

Before closing I just want to remind my brother shoers to study anatomy. Watch the gait of a horse and how he stands before you shoe him. Determine the kind of shoe the animal needs before you give it to him. You'll

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find the art of horseshoeing a fine art hard to learn. It requires constant study and observation. No two feet are alike, and each must be studied in turn if we are to be successful.

The Treatment and Cure of Foundered Feet.

A. F. LIBBEY.

In treating feet that are out of balance (nearly one half of such cases are due to some diseased condition of the body) it would be unreasonable to expect to restore the foot to a perfect condition if the body still remained diseased, as in some cases of founder and pinched feet. If the horse has a cough after being foundered, attend to that as well as the shoeing.

The foot in the engraving represents a case of acute founder. The pedal bone has settled so that it stands nearly on the point of the toe, and the greater part of the sensitive laminæ has perished. We find the toe long and flat with a short frog and high heels.

In dressing a foot of this kind, cut down the heels as far as you can with safety, running your rasp to the center of foot on a level. Fill the space at the toe with leather. In the acute form you will find the settling at the coronary cushion. In milder forms you will find an arch in the front of foot about halfway down.

The shoe I use for founder is shown in the engraving and if properly applied it will do good work. If the foot has dropped very much place a strip through the bottom of the foot after the shoe is nailed on. If the foot is about level across the bottom spring it but very little. The object of the shoe is this: In foundered feet, the laminæ of the foot being diseased, there is little to hold the pedal bone to the shell. The strip through the center above mentioned takes the place of the diseased leaves and stops the



THE PEDAL BONE HAS ALL BUT CUT THROUGH THE SOLE OF THE FOOT

settling. Do not give too much frog pressure the first time.

If calks are used either set the toe calk well back on web of shoe or use four calks, setting the front ones between first and second nail holes.

The diagram on page 246 shows the measurements according to which a sound foot is prepared before shoeing. The angle, as will be seen, is slightly greater than 45°, or about 47°.

The Currycomb and its Use.

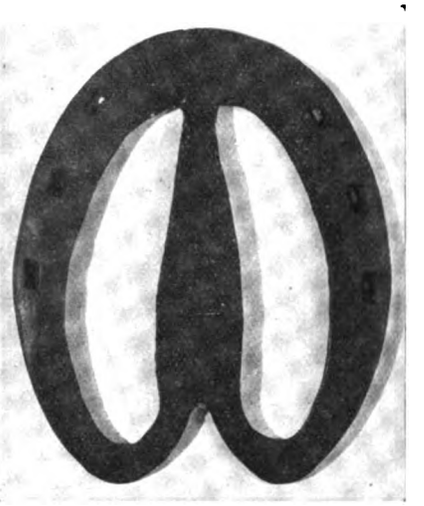
J. C. L.

I have so often come across the "currycomb fiend" that I think it about time something was done to rid the horse kingdom of this pest, which is as bad, if not worse, than that very troublesome little mite, the fly. In the first place, I do not believe that very many of the men who have charge of horses know what the currycomb is for. At least, my dealings with them for many years past doesn't seem to indicate that very many of the men know the real office of a currycomb. As ordinarily used the currycomb does more harm than good. When used on a horse at all, the comb should be used carefully and with judgment.

The general run of stable men take up the currycomb and brush and comb up the entire coat of the animal, combing hard against the coat in an effort to loosen dirt and scurf. But the hard, unyielding teeth of the comb only injure the skin, scratch, and produce more scurf than they remove. The occasional rub across the comb with the brush just helps to keep the teeth sharp and clean, so as to scratch thoroughly and well.

The currycomb, when used, should be rubbed in the direction of the hair only, and then it should have but a light bearing. When used it should be only for the purpose of removing such dirt that cannot be removed with the brush. The principal use to which the comb should be put is to clean the brush. The comb in no circumstance should be used on the legs of a horse. These, when muddy and in such condition as to be not very easily cleaned with the brush, should be washed and thus thoroughly cleaned. This washing will also largely, if not entirely, prevent that very disagreeable disease known among Eastern horsemen as "scratches." I have seen otherwise gentle animals kick furiously when approached and suffering from this trouble. It begins as a sort of scabby formation of the foot, between the fetlock and the heels. If left to itself the foot at this point breaks open and becomes a running sore.

The secret of sleek coats is not a reckless currying of the hair every week, but a brushing and smoothing of the coat at regular intervals. By far a better combination for keeping the horse's coat clean than a currycomb and a horse brush is two common medium soft scrubbrushes, with a finishing rub with a soft cloth. And



A SPECIAL SHOE IS RECOMMENDED FOR THE TREATMENT OF FOUNDER

when using anything on a horse's coat rub in the direction of the hair and not against it.

More Information on Filling Sarven Wheels.

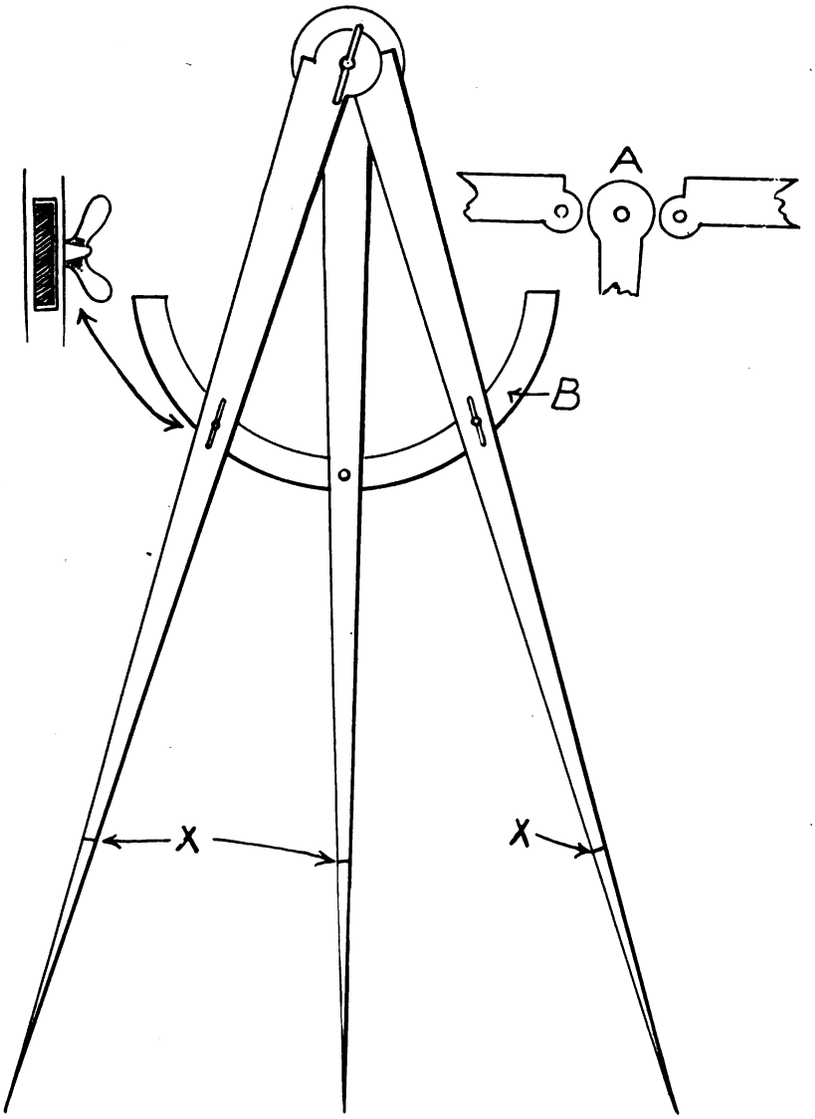
J. M. FAWVER.

So many ideas are expressed in regard to refilling sarven wheels that I feel compelled to express myself rather plainly on the subject, and I hope the day will arrive when all the botches will be compelled to take a back seat. There is only one way to refill or respoke a sarven hub properly, and that is to take out *all* the rivets. Remove all the spokes and space your circle of hub and flanges. Cut all spokes so as not to crowd each other out of the hub, get a perfect fit of all shoulders, and set in best quality of glue.

I notice that Mr. W. A. Short in the May AMERICAN BLACKSMITH is on the right track, while Brother J. D. Ennis, of Florida, is far from the right principle. I am engaged in carriage repairing and have a large patronage. I can safely guarantee all my work to give perfect satisfaction, and I challenge anyone that uses the "notch system" to come up with my work. I fit my spokes perfectly, drive them in the best glue, tenon and rim, then bore holes through the flange holes and insert new rivets after flanges are properly drawn up to the spokes. The flanges are never crowded away by irregular width of spokes, and rivets are always proper length to

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head with rivet set on back side of wheel. When this method of filling sarven wheels is used, there is no chance for complaint from the customer. I have noticed the different improper systems of filling sarven wheels in the columns of THE AMERICAN BLACKSMITH for several years. Should any reader desire instructions on this or any other subject in this line of the trade I will gladly give same upon application.



A VERY SIMPLE AND EASILY MADE TOOL OF MUCH HELP TO THE GENERAL SMITH

A Talk on Brazing Cast Iron.

S. J. PEMBERTON.

We will try and give you a few lines on brazing cast iron, as we do not see anything written on the subject and have been told that but two per cent of the craft know how to do brazing. We cannot see why every blacksmith cannot make a success of it, as it is easy when you once get the idea. The main requisite is to keep your work clean and securely clamped. If this is done you cannot keep it from brazing. But we find in this locality that nine tenths of the blacksmiths say it cannot be done, for the simple reason that they will not try to learn it. We find our brazing outfit to be one of the biggest trade pullers we can get. We not only put cast iron together, but put wrought iron or steel to cast iron and guarantee it never to break in the same place, as the brass is tougher than the cast iron. This little piece of work of brazing cast iron pulls us work from the other shops. They have got so they send it to us to be brazed. The hardware houses also send castings to us to be brazed, for they often get castings that are so far out of date that the company does not make them any more. In this case it means a new machine and very likely a delay. A customer came into my shop a while ago and told me he had to buy a new pump head because he could not get a handle, which would cost him $7.00. To braze the handle would have cost him but 75 cents. I had another customer who broke a binder the first day out in a field of eighty-five acres of wheat. This would have stopped his machine seven days, if it had not been that I brazed cast iron. As soon as he found out he could not get the piece, he came to my shop and in two hours he was in the field at work again. This kind of work is what makes fast customers, the kind that will stay with you and tell neighbors. Try brazing cast iron, and see what friends it will make for you. Any information I can give you through the paper will be given at any time you may ask it.

How to Make a Pair of Three-Legged Dividers.

A. T. WRIGHT.

I will try to tell how I made a pair of three-legged dividers for use at the forge. The joints are old buggy elbows as shown at A. In using these as much of the bow can be used as required. The points of the legs are tool steel, the steel point extending for a distance of several inches up the leg as shown at XX. The center leg is, of course, made stationary. This is done by fastening the other legs to it at the joint and by fastening it to the slide or half circular piece by means of a rivet, which is countersunk in the leg. The slide passes through a slot in the movable legs, and these are held tightly by it and thumbscrews.

The uses to which one of these dividers can be put are too well known and too many to need explanation. The careful smith has always need of them in making duplicate forgings or in repairing parts that must measure exact.

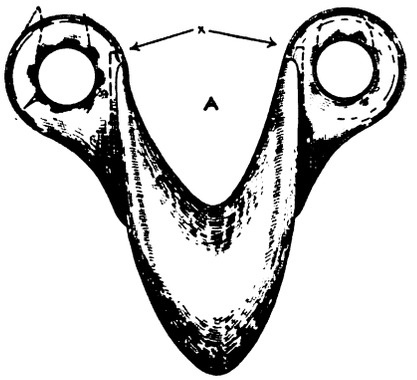
How to Attach Sparking Device to Engine having Hot Tube Ignition Only.

L. F. STILLIANS.

Most of the gas engines nowadays have battery ignition, but possibly someone may be unfortunate like myself and have an engine with a hot tube. This is how I attached the battery: I drilled a $\frac{3}{4}$-inch hole through the water jacket into the ignition chamber and screwed a $\frac{1}{2}$-inch pipe into this. The pipe is $\frac{7}{8}$ of an inch on outside, thus taking a $\frac{7}{8}$ tap to cut the threads. I then put on coupling and screwed in the spark plug. This gives about $2\frac{1}{2}$ inches to compress the gas to the spark. Of course, I would like to have had it closer, but could not fix

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it so in this case. I use a good jump spark coil with a vibrator in connection with the battery. This, of course, requires circuit to make spark only. One wire must be insulated from the



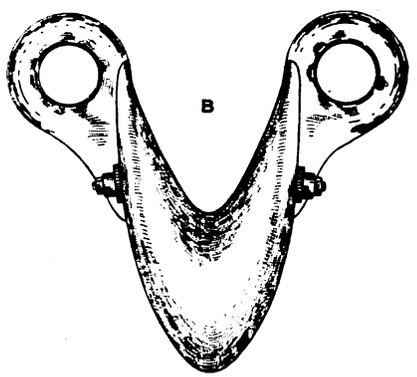
SHOWING HOW THE ROPE PULL HAD WORN WITH USE

machine so that it will come in contact only at the right time. This is done by attaching so that it will come in contact with the exhaust cam just at compression. My engine runs better than I ever could get it to run with the hot tube. I hope this will meet the eye of someone to whom it may be a benefit.

Repairing a Rope Pull.

GEORGE NABLO.

The illustration at A shows a worn rope pull as brought into the shop. These pulls are used in well drilling work, and are, no doubt, a familiar article to those smiths who live in well drilling sections. The dotted lines in the eyes as shown at A show how this pull was worn and broken. The dotted lines at X show how the eyes were cut off with the hack saw and chisel. I then forged a set from wrought iron and secured them to the pull as shown at



SHOWING HOW THE PULL WAS REPAIRED

B and C. The bolt does not go entirely through from side to side, but there are two of them, one on each side so as not to interfere with the rope when placed in the gutter of the pull. A cross plate enables the bolts and nuts to hold the two eye-shanks securely.

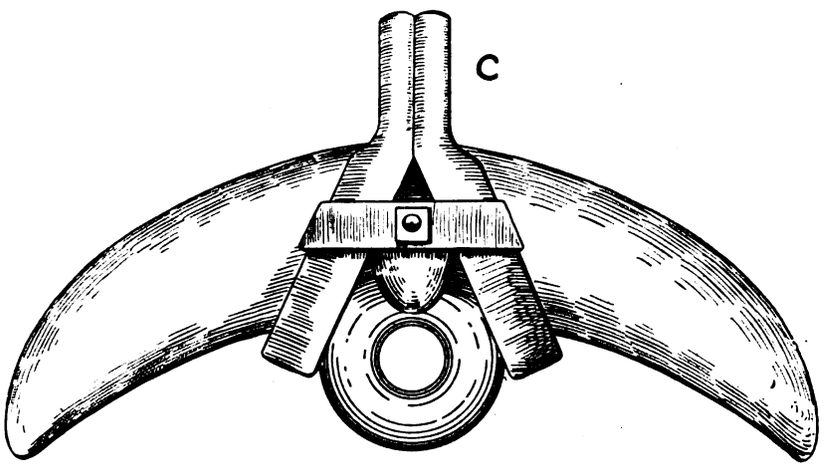
Thornton's Letters.—10.

Being "Straight-from-the-shoulder" Talk from a Prosperous Self-made Smith to his Former Apprentice, now in Business.

Dear Jim:

Shake, old man, and shake heartily. Your recent letter gave me more genuine pleasure than I have experienced for some time. Made me feel just like going down and treating you to a soda pop. You are certainly made of the right stuff—the kind of material that wins every time. But, then, I always knew you were—knew you would measure up to the mark when it came to the final test.

Raised your prices and installed a gas engine! Say—but won't the other fellows scratch their heads! Bet you they're "puffin' 'round some," as old man Ross would say. Are the other chaps saying anything? Does any of their talk reach your ears? Do you know what they say about you and your method? It wouldn't be a bad idea to keep your ears wide open so as to catch any stray talk that may be of advantage to you. You can take it from me that you have them guessing now. Bet you they're wondering what you'll do next. And I want you to keep them busy thinking about you all the time. Just give them a new surprise every little while. I knew there would be little or no falling off in your trade. The people that would not stick with you after you showed them that you absolutely needed more money for your work were not worth holding. You will find that there are plenty of good, sound business heads who will appreciate good work done at the right price. And you will be surprised, old man, how much that gas engine will help you. I am mighty glad you got it. Also to know that it's running O. K. And while we are on this subject, just let me say a word about home-made machines. Don't try to make all of your machines in the shop. If you can afford it, buy them ready-made from a manufacturer who makes a specialty of good smith-shop machines. A shop-made machine is all right for a time, but it will not last nearly as long nor give the satisfaction that a good, honestly made factory machine will. Another thing: don't fail to build a little engine room around your engine. Partition it off from the rest of the shop. Keep the grit, dust, soot, and other dirt away from the engine. It will pay you in the end by a good deal. Have a neat little box for your wrenches and tools. Keep the waste and polishing cloths in a covered tin, and see that they are always where they belong. I also like the idea of having a box of common sand in the engine room. Somehow or other, it makes things a bit safer, and it may prevent a serious fire when the unexpected happens. Don't under any consideration store anything in the engine room. It is best to have nothing but what is needed on the engine. Anything else is sure to be in the way, and when a man has to climb over a pile of scrap or a keg of nails or two when cleaning the engine, he is certain to neglect this important little job sooner or later.



A SIDE VIEW OF THE ROPE PULL, SHOWING HOW NEW EYES WERE FASTENED

I could fill page after page on the subject of gas engine care, but rather suggest your purchasing one of the many small books on the operation of the gas engine. These can be had at a very low price and are of much value to the gas engine operator. About the best I can say is simply this:

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Don't get excited, keep a cool, level head, whether starting, stopping, or repairing the engine.

Yes, that raise you made was a considerable one. As I told you in my previous letter, get what you deserve. There is no reason on earth why you should be doing business at a loss. The only excuse a man has for doing business at all is to make money, and if he cannot do this, he is making a fool of himself by not getting out of business just as soon as he can. By the way, Jim, how would it be to approach the other fellows on the subject of organization? Of course, they may think that you are getting sick and tired of fighting them, but you will have to go at the subject very carefully and with a good deal of tact. Perhaps the time is not quite ripe for this thing, but I leave that to you to know whether or not this matter can be taken up now. Perhaps you had better leave this matter until I come down the latter part of this month. Yes, I am counting on paying you a short visit. I want to look over the town and get a better idea of your field and the situation down there. Mrs. and myself are going to take a vacation, and we will stop off for a few days at your burg.

Now, keep a good stiff upper lip, old boy—follow up your advantage every time you can. Keep your eyes and ears open—don't allow yourself to sleep during business hours. If these other chaps ever find you napping these days, your name won't be Jim any more. So be on the lookout every minute of the day.

If anything new comes up don't fail to let me know about it immediately. I just enjoy fighting these chaps that don't know any better than to run their business at a loss. Keep your eyes open, old man. Don't be afraid to run things with your gas engine. Keep pushing continually and you will find that this little fight of yours will fade away like a fog before a rising sun, and you will have the field entirely your own way.

Yours for better prices and the success of Jim's Power Shop.

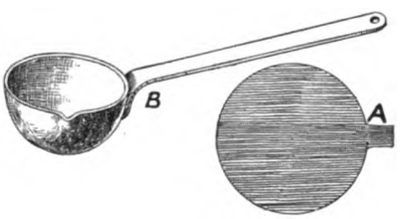
Thornton

How to Make a Melting Ladle.

W. D. BOETTLER.

The accompaning engraving shows a melting ladle that is useful in a shop, and with the description may help some to make one.

A ladle that is made of wrought iron will not break like a cast iron one. Take some old or new piece of flat



A MELTING LADLE IS ALWAYS USEFUL TO THE GENERAL SMITH

iron or steel about ¼-inch thick. Cut it as shown at A, and weld on a handle. Now take a wide band about 1½-inch smaller than the piece cut for the ladle. If you haven't a band of this description, make one. Heat the piece from which you intend to make the ladle until it is red hot. Take a round-faced hand hammer, lay the flat piece on the band, and hammer it down until you have it in the shape of a ladle. It may take several heats to do this, for it all depends on the size of the ladle. When completed it ought to be the shape as shown at B. This will be found handy to melt lead or Babbitt metal in.

A Three-Horse Evener for Plow or Harrow.

JAMES WALLACE.

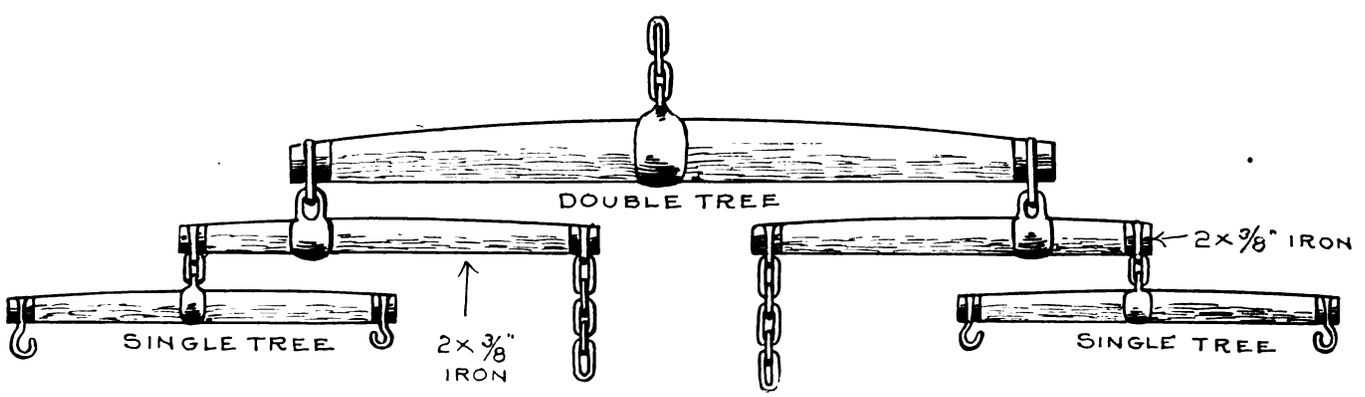
The accompanying engraving shows a three-horse evener for use on a plow or harrow where there is no tongue. The principle is the same as Brother Wright's in the June number, but this plan makes a lighter evener and has less rigging. The equalizers as shown are of 2 by ⅜-inch iron about 18 inches long with the holes punched ⅓ of the distance from the ends. An old single-tree iron welded on the long end will be found strong enough. On the short end a heavier hook is needed, however, and this is supplemented by a small clevice and a ring for the middle of the singletrees. This arrangement can be attached to any two-horse whiffletrees in a few minutes. It is the best plan I have yet found, and I have tried several. By using this plan and crossing the traces the inside horse will have plenty of room without chafing his legs on the traces.

Locomotive Smith-Shop Foreman for Half a Century.

On June first of this year Mr. James Walker rounded out fifty years of service in the employ of the Chicago, Burlington & Quincy Railroad as foreman blacksmith.

Mr. Walker was born in Wilmington, Delaware, November 20, 1834. At the age of seven years he moved with his parents to Detroit, Michigan. His father died a short time after the family arrived at Detroit, and young James, was started to work in a smith shop as apprentice and soon became an expert in that line of work. At the age of nineteen, he was chosen as foreman of the Chicago Engine Works, where he served until taking charge of the Chicago & Northwestern shops in the same city. He continued here until June first, 1857, when he started his half century of foremanship at the Burlington shops.

Mr. Walker was elected Mayor of Aurora, Illinois, in 1870, and served in this capacity with credit to himself and the city. He is a prominent member of the International Railroad Master Blacksmiths' Association, and



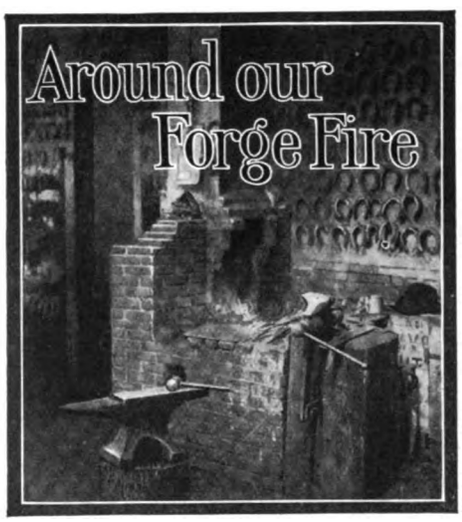
A SIMPLE ARRANGEMENT FOR A THREE-HORSE EVENER WHEN NO TONGUE IS TO BE USED

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he is often mentioned in the proceedings of that organization.

In speaking of Mr. Walker's years of service as foreman of the C., B. & Q. shops at Aurora, a prominent "Q." man says: "At the age of seventy-three he is still efficient and a valuable man to the company. All these years, since his appointment as foreman was posted in the shops, he has filled the office and grown with its increasing demands, for the position is now not what it was when he first took it. It is a remarkable story of fidelity. He is the kind of man who makes it possible for a company to do business —the kind on which it can rely—the kind that sticks through sunshine and storm, that loves his work and makes it his duty.

"This is the sort of man about whom one likes to read, and it may well be said that whatever he does he does well. James Walker's life is an example for all men who have no fixedness of purpose and who vacillate from one thing to another until they lose all fitness for any occupation."



"Hello, Benton, old man," exclaimed the Editor, as the man of recipes opened the door; "you're just the man I want to see. Here's a chap who wants to know how to deodorize glue," continued the Editor, as he handed a letter to his visitor.

Benton took his customary seat, perched his feet on the desk of the Editor's assistant, and, after reading the letter, took out his recipe book.

"Guess I've got something on the subject," said he. "Seems to me I heard something about saltpeter being good to take the smell out of glue. Ah, yes, here it is. To deodorize glue use a teaspoonful of saltpeter to a pot of glue. This will also help to dry the glue when applied, and make it harder, and moisture is not so likely to affect its sticking qualities or its strength."

"Well, that is certainly a very simple method of disposing of a very disagreeable part of a gluing job," returned the Editor. "By the way," continued he, "how do you recommend making glue?"

"That's a good point to bring up," replied Benton. "I don't believe that most men get all there is in glue when they prepare it for use." Then, taking up his recipe book, he read, "A hot glue for use on paper, wood, or metal is made by soaking the best white fish glue in its own weight of cold water for four or five hours. The softened glue is then heated up in a glue pot and a pint of acetone is added to it when the glue is boiling hot. This mixture is applied hot and I should think would be excellent for use when setting spokes."

"You haven't a formula for waterproof glue, have you?" asked the Editor.

"Why, yes, I guess I have," replied the other, turning a leaf and reading. "A strong solution of alum added to the glue will make it waterproof, while a small quantity of chloride of lime will make the glue more elastic and prevent its cracking and drying out after being applied. The addition of raw linseed oil also renders glue insoluble in water. The glue is soaked in water as usual and then dissolved or melted in linseed oil at a moderate heat."

"While we're on the subject of glue, can you give me a formula for liquid glue or one that will remain liquid after cooling and can be used on a number of articles?" asked the Editor.

"Why, yes," returned Benton, "here's a recipe for a liquid glue that can be used for joining a variety of materials. Soak a pound of good glue in a pint and a half of cold water for five hours, then add three ounces of sulphate of zinc and two ounces of hydrochloric acid. This mixture is then kept at a heat of from 175 to 190 degrees for about ten hours. Perhaps a simpler formula and one requiring materials that are more likely to be on hand is the following: Soak one pound of good glue in a quart of water. After soaking for a few hours, heat the mixture in the unabsorbed water and then stir in about a quarter of a pound of dry white lead. When well mixed pour in four ounces of alcohol and continue boiling the mixture for five minutes longer."

"Well, that's good glue information," said the Editor. "You talk like a specialist on stickum." Then, continuing, he asked, "Isn't there some way of telling good glue from the poor article when purchasing it in the gelatine form?"

"Yes, a man versed in glue manufacture can to a certain extent tell by looking at the gelatine whether it is a high or low grade product." Then, continuing, Benton gave a little explanation of glue manufacture. "When drying the gelatine, which is done by means of hot air currents, small air bubbles form inside the cake, or sheet. This is owing to the quick hardening of the outer skin, leaving an inner layer from which the moisture escapes with difficulty and in which the air bubbles remain. Of course, the best qualities of gelatine dry quickest, therefore the presence of minute air bubbles can usually be taken as an indication of superior quality The poorer qualities rarely contain air bubbles. These air bubbles, however, must not be confounded with gas bubbles, which occur when the gelatine is dried by the old method. These gas bubbles are caused by fermentation, and are, of course, a sign of bad quality. The gas bubbles are large, however, while the air bubbles found in the best gelatines are minute, very close together, and in the center of the sheet."

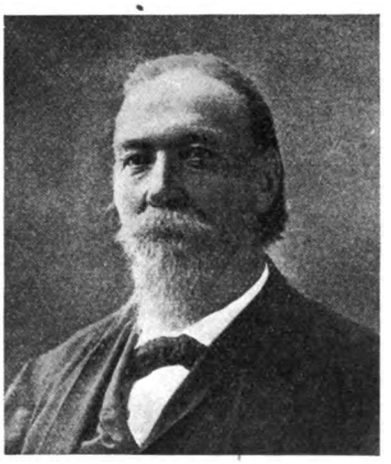
"Say, Benton, you must have worked in a glue factory," returned the Editor, smiling. "Where did you get all that information?"

"Why, I worked in a town that was overrun with glue factories some years ago. But I got out after I had been there two months, and saved enough money to get away far enough from the smell. Of course, I got acquainted with some of the glue men and found out all about the making end; but I didn't stick, just the same."

"Well, that's news to me," replied the Editor. "I didn't know you were ever very far away from your home town."

"Oh, yes, I was up in Canada for quite a while, besides several years in the central West. By the way, I think I'll go up to visit my Canadian friends for a couple of weeks the latter part of the month. I've had a letter from one of the boys up there who's made his pile and retired to a neat little farm. He says he can show me some fine fishing holes, and I think I'll just take the Mrs. up and have a good rest."

"Do you know, Benton? I've nearly forgotten about vacation time," exclaimed the Editor. "I've become so interested in planning future issues of the paper that I have forgotten all about taking a vacation. A man should certainly take a rest for a time in summer, and I hope every AMERICAN BLACKSMITH reader will take time for a quiet week or two in the country or at the water side. I insist upon the boys taking two weeks every summer for their very own, and I know it makes them better fitted for work when they return."



MR. JAMES WALKER, WHO HAS BEEN A FOREMAN SMITH FOR THE "Q." FOR FIFTY YEARS

"Well, I always believed a man should have a vacation and get back to nature for awhile. I usually go away every summer and take a genuine rest," returned Benton. "You'd better come with Mrs. B. and myself. I'll guarantee a good time for you and your best girl."

"That's real good of you, Benton," replied the editor, "I'll ask Mrs. Editor."

The office boy came in at this juncture and the Editor had to give his attention to a pile of new proof from the printery.

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The Village Blacksmith.

Under a spreading chestnut tree
The village smithy stands;
The smith, oh what a peach is she,
With diamonds on her hands!
Through leafy roof the sunlight streams
Upon her golden strands.

Her eyes are blue, her lips are red,
Her lashes drooping long;
She chaws her pepsin gum and hums
A little ragtime song.
She never winks at passers-by—
No, no—'twould be so wrong!

The Blacksmith Maid.

Where famed St. Louis sits beside
The River's turbid flood—
(Composed of water, say six parts,
And four of good rich mud)—

Behold a modest blacksmith shop,
Where horses may be shod;
And when you glance within this place
You see a sight most odd.

A maiden fair the bellows blows,
Or wields the heavy sledge,
The while the 'smith a horseshoe makes
Or gives a tool its edge.

And when she shoes a horse, methinks
That were a sight to see—
And many a man who stands and looks
Exclaims, "Would I were he!"

Suitors? Ah, yes, at least a score,
Have sought the strong right hand
Of this, the only lady 'smith
In fair Missouri's land.

But to them all she says, "Not yet—
I'm in no haste to wed."
Then glances at her anvil's face
And strokes her hammer's head.

The would-be poet, always on the alert for a timely subject, has not overlooked the St. Louis girl blacksmith. The poems above are both from exchanges and seem appropriate this month.



If you don't try, how can you know?

Simplified spelling: W-O-R-K—success, L-U-C-K—failure.

Who strives for success doubtingly is already defeated.

If you work for a man, for your own sake work for his sake.

Better one cent honestly earned than a dollar gained by trick.

If at first you don't succeed, read THE AMERICAN BLACKSMITH.

Cheer up and hustle. Mighty few things are as bad as they seem.

We may work without succeeding, but we cannot succeed without working.

Occupation is a motor of high velocity, but idleness is a brake on the wheels of time.

One apprentice in the shop is worth a dozen that have promised to start in tomorrow.

Don't hinder a good cause, even if you can't help it along. You can at least help that much.

"**Practice** makes perfect," said Tom Tardy, as he attempted to weld the axle for the fourth time.

Like the anvil which has worn out many hammers do some smiths withstand the knocks of their competitors.

Phenomenal has been the rise of platinum in the past few years. In 1906 its price was five times that of 1890.

Nine feet in diameter are the wheels of a farm wagon exhibited at Jamestown Fair. Other parts are in proportion.

238,600 pounds is the weight of an anvil recently cast for a 24,000-pound steam hammer.

'Tis not trouble that kills—but worry. And most of the trouble we worry about never troubles us.

Some smiths waste time awaiting opportunity—others hustle while waiting. Which meets opportunity first?

"**The pen** is mightier than—" Yes, and the sledge is mightier than the baseball bat or the walking cane.

More men should be like good tools—keep their temper. Proof of temper in man is the loss of it—not so in tools.

Play to win—that's the slogan in this business game. Hustle and work, continually, persistently, everlastingly.

An honor to any workman is the title "Foreman"—but is the workman always an honor to the title? He should be.

If everybody knew everything about everybody's business, nobody would say anything about anybody's business.

Are you preparing for death, or are you taking every minute for bristling, bursting life? Life begets life. Don't be a dead one.

If competition is the life of trade, is cooperation the death of it? Try it and see. Write the secretary today for association plans.

Not always does the hardest working smith draw the fattest pay envelope—takes other qualities than brute force to command big pay.

Keep thy shop and thy shop will keep thee—and keep THE AMERICAN BLACKSMITH in thy shop always. Tell your neighbor.

Quality advertises your shop better and speaks louder than the ring of your anvil. Put plenty of it in every job and give it a chance to talk.

The man who works like a horse usually gets a horse's wages—three meals a day and a place to sleep. Work with the mind brings the extras.

The best advertisement is a satisfied customer, and the circulation of such advertising is limited only by your ability to get customers to satisfy.

Say well of your competitor or say nothing. If he does poor work, people will find it out; if his work is better than yours, they'll know it, no matter what you say.

Shout from the house tops if necessary, but do make an effort for more trade. Don't, for business' sake, let your business stand still. Keep it moving steadily forward.

"**No money** in it," said friend Tom when asked why he didn't clean up his shop and hustle a bit. There's certainly no money in anything into which a man won't even put time.

Don't ever forget it. Not only does it bring bigger and better trade, but it tends to make your men turn out neater work. It certainly pays big to keep the shop tidy and neat.

Luck whines, but labor whistles—luck waits, but labor works—luck lies abed and wishes for a legacy, but labor hops out at six and with ringing hammer forges the foundation of a fortune.

Looking ahead always is the modern smith. The profit on past jobs cannot be made again and present prosperity cannot last forever. There must ever be a look ahead for things coming.

Ring out, anvil, and tell the country round about that before you stands one of God's noblest creations, an honest workman, who in the sweat of his brow justly earns every penny he gets.

Ever had the experience of your helpers leaving you one after another as fast as you get them broken in? Then you will know how to appreciate and reward a good, reliable man who sticks by you.

An excellent opening for a smith who wants to work on new wagons and repair work is offered at Oakville, Pa. Anyone interested may get full information by writing to J. J. Dewalt & Son, of that place.

Like an ant striving to make honey, a man may work his heart out and still not gain success. Brains, proper equipment, and then persistence—that's the recipe for success. Work without these spells failure.

One smith we know gets after business in this wise: "If I do your work, it'll be done as well as I know how, and I've been at doing things just that way since 1867." He knows how and has built up a successful business.

A temperature of 6,300 degrees Fahrenheit is possible with the oxy-acetylene blowpipe, which produces the hottest flame known. The flame is under perfect control, and it is possible to cut steel six inches thick with it.

You pick a jobber out of the hundreds you hear about because so-and-so trades there and gets good service. Ever think about how your would-be customers apply the same rule? Moral: Give good service and get good customers.

A man may spend fifty dollars on a kit of tools and yet put but thirteen cents' worth of brains into their use. And then he wonders why he doesn't get more money for his work. It's the man who mixes good brains with good tools who gets a good price.

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Too bad more men aren't like phonographs—have something to say, say it and stop. Some chaps might at least have the reputation of being smart if they said a good might less.

A town of two general stores, one hardware store, one resturaunt, one hotel, one lumber yard, three elevators and one feed mill offers a chance to a good, live general smith. Anyone interested in locating in Minnesota should write to Winter Brothers, of Johnson, Minnesota, regarding this opportunity.

"A good, upright, temperate man" will find an excellent location awaiting him at Ushers, New York. The nearest smith is three miles distant, and a good man will find plenty of work of all kinds. Any reader interested in locating in Saratoga County can get full information from Mr. Joshua Anthony, of the above town.

A prosperous section of northeastern Missouri is very anxious to get in touch with a good smith. This location is about six miles from town, surrounded by prosperous farmers. The people are very anxious to get a good shop and a good smith will do well to locate here. Interested readers are invited to write Calvert Brothers, of Hunnewell, Missouri, for full information.

What do you think of a man who says his shop is so hot that he has to shut it up these summer afternoons, and yet who goes and sits by the hour fishing in the broiling sun? We know such a one, and his name is neither Dick nor Harry. Is it not praiseworthy of him to work so hard that way to provide food for his family? His time is so taken up that his wife has to take care of the truck garden.

An epitaph in a churchyard at Sutton, England, reads at follows:

"My sledge and hammer lie declined;
My bellows, too, have lost their wind;
My fire extinct, my forge decayed,
And in the dust my vise is laid;
My coals are spent, my iron gone,
My nails are drove, my work is done;
My fire-dried corpse here lies at rest;
My soul, smoke-like, soars to be blest."

American Association of Blacksmiths and Horseshoers.

Summer is generally said to be a no-business season, but I have never thought very much of this kind of talk. Seems to me that the reason little business is transacted at this time is because little business is gone after. The only way to succeed in doing what you start out to do, is to keep continually, everlastingly, and persistently at it. Of course, you know I am talking more especially of things in an association way. When it comes right down to business, I think that the association season is *right now*. A good many requests for plans have come in lately, and you can bet your bottom dollar that some growing branch associations will be in running order this fall. Suppose, Mr. Reader, we number your county among those in good running order.

Just consider with me for a minute what a small advance of twenty cents per horse means to you. Suppose, for instance, that your shop averages but ten horses a day: counting the working days in the average month, we will say, about 260 horses per month. Now, suppose you charge twenty cents advance per horse—not per shoe, mind you, but just a small raise of twenty cents per horse,—do you know that it would mean just $52.00 more in your pocketbook at the month's end, and this without a cent of additional outlay? You wouldn't need an extra man—you wouldn't need an extra fire—there would be no more horses than ordinarily—no more time—no more fuel—nothing more at the cost end, but $52.00 more at the profit end. Doesn't this appeal to you? Why can't you do it? Is there any possible reason why you can't? Word comes to me from an Ohio branch that prices have been raised to just about double what they were. These smiths were getting $1.50 for four shoes, and they have raised their price to $2.50. A new plowshare which formerly cost $3.00 is now priced at $5.00. This same thing can be done in your county, Mr. Reader, if you will but get the smiths together. You need the protection of cooperation just as well as do the other craft workers. Address me today at P. O. Box 974, Buffalo, N. Y., for my easy plans for forming branch associations. You can get things well under way by fall, raise your prices at that time, and get the full benefit of the fall and winter rush. Speak to your brother craftsmen on this subject. Ask them how they feel about it. I am pretty sure you will find them very anxious to join hands with you for the protection of their business interests.

Just consider, Mr. Reader, this subject is of vital importance to not only yourself, but those depending upon you. It is a matter of bread with or without butter. It means either comfort or want for your family. You will find that prices will continue to advance for some time. You know and I know that they have been advancing right along, and you can get it from reliable authority that the end is not yet in sight. Therefore, prepare not for today, nor try to make up for yesterday, but prepare for tomorrow. Take up this matter now, right away. Don't put it off until you forget it. It will take you but a fraction of a minute to address a postal to me for my complete and easy plans for association work. Give me a chance to cooperate with you. I am ready and waiting.

THE SECRETARY.

The Fifteenth Annual Convention of the I. R. R. M. B. A.

The fifteenth annual convention of the International Railroad Master Blacksmiths Association will be held at Montreal, Canada, August 20, 21, and 22. The Bath Hotel has been selected for headquarters during the convention. Special arrangements have been made here for the entertainment of members of the association and their friends, and the Session Hall will be turned over to the smiths for their meetings.

Several interesting subjects will be discussed at this year's convention. The following are the most important:

FLUE WELDING—John Conners, chairman.

TOOLS AND FORMERS FOR BULLDOZERS AND STEAM HAMMERS—G. M. Stewart, chairman.

PIECE WORK—Grant Bollinger, chairman.

DISCIPLINE AND CLASSIFICATION OF WORK—S. Uren, chairman.

CASE HARDENING, TIME TAKEN AND SAMPLES—George Masser, chairman.

BEST FUEL FOR USE IN SMITH SHOP—Joseph Jordan, chairman.

FRAME MAKING, EITHER STEEL OR IRON; ALSO REPAIRING SAME—Grant Bollinger, chairman.

THERMIT WELDING—George Kelly, chairman.

WHAT CAN EACH MEMBER DO TO INCREASE THE USEFULNESS OF THE ASSOCIATION?—G. F. Hinkens, chairman.

Anyone wishing further information regarding the above meeting, the subjects, or other matters pertaining to the convention can obtain same from the secretary and treasurer, Mr. A. L. Woodworth, Lima, Ohio.

A Talk on Prices and Price Cutting.

J. H. TOMPSON.

When a man cuts prices, whether he's a blacksmith, a wagon-maker horseshoer, butcher, or barber, I am always inclined to think that there's something wrong with either the goods or the man. If a smith cuts the price you can usually gamble on the job being cut too. If a smith needs money he can't afford to cut prices, and if he doesn't need money what does he want to cut for?

Of course, we're all human—a dollar greenback looks as big as a house to

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me, and it probably looks the same to every other member of the craft. But for all of that I don't go to Blank's Sons just because they sell a nameless brand of shoes at fifty cents a keg less than some standard house does a good brand. No, sir; I go where I can get something good—not at a cheap price, but at a fair price. I go where I can get what I want at the price it's worth.

When a circular comes into my shop telling about some cheap-skate house having secured a million kegs of shoes from some well-known shoe manufacturer and Messrs. Cheap-Skate & Co. are going to divide profits with me, I simply light the fire with the paper and phone an order to my jobber for a keg of shoes that I know. When a house can't tell you who made the shoes they're selling, you can take it that there is something wrong with the shoes or the house. In either case you don't want to have anything to do with them. If the shoes are really worth a certain price—and C.-S. & Co. usually say they're worth half again as much as they're charging—you can gamble on it that C.-S. would get the full price. There's always something wrong, to my mind, when a house cuts a price. It may be the house, the goods, or, if it is a real bargain, they'll get their right pay with interest on something else.

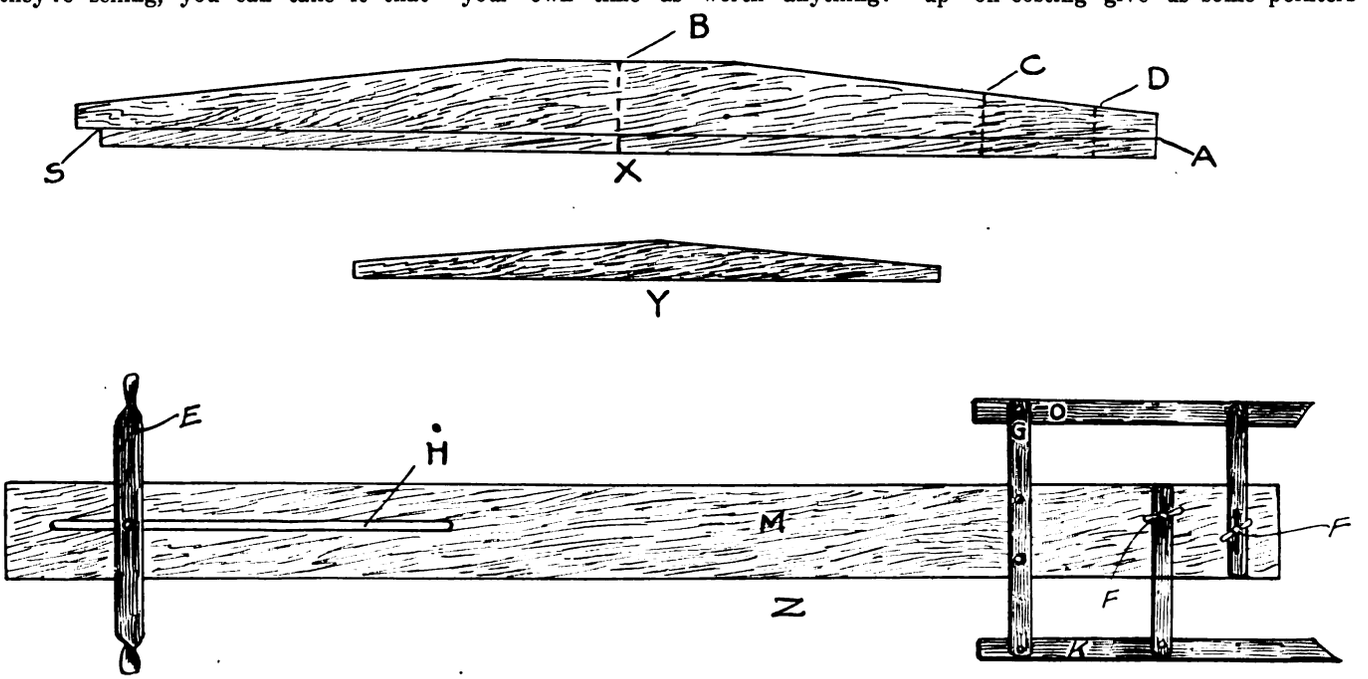
All of this on the subject of price cutting because I think our customers figure and reason just as I have. Granted, of course, that there are exceptions, but I am pretty sure you'll find the general run of your customers figuring just as I have figured.

Quite a number of my customers have said time and again that good work at a fair price was all they wanted. And, while I get a good price for my work, I do good work—guarantee it, in fact—and am holding my trade against a number of price cutters.

Now as to the right price to charge for work! How do you figure your prices? Suppose a man brings in a welding job that takes you about half an hour to fix up, do you charge him the same as the man with a half-hour job that requires no fuel? When you figure prices on such standard jobs as shoeing, wagon repairs, and tire work, do you figure rent, fuel, insurance, time? Do you figure on any loss by dead beats? Do you figure your own time as worth anything? Or do you simply take the cost of a pair of shoes, add cost of nails and fuel, and then tack fifteen or twenty cents to carry the other expenses? This system of business costing, if it may be so called, is the stumblingblock in the paths of altogether too many smiths. They expect a living and money in the bank from something into which they are miserly about putting their time.

Doesn't seem to me that there should be such an awful big difference in prices in various sections of the country. Of course, it is but natural that there should be some difference, but why so much difference I cannot understand, except that smiths in different sections don't figure prices right. Or, if they do, they allow the other fellows' prices to influence them. And right here is another stone in the smith's path to success. Charge your own fair price and do the very best work you know how to do. Perhaps it wouldn't be the best thing in the world to put prices way up when you start in a new place, especially if the other smiths have been getting little for their work. But you can raise prices gradually, and, with the right kind of talk, hold your customers.

Now, brothers, let us have more talk on this subject—the price is what we're in business for, and it certainly demands our attention. Let us discuss the subject of figuring prices and costs—we cannot know too much on this, and we can all learn from one another. Let some smith who is "right up" on costing give us some pointers on figuring prices—let him tell the rest of us how to figure fair and square, both for ourselves and for the customer's purse.



A SIMPLE AND EASILY CONSTRUCTED DEVICE FOR SETTING AXLES PROPERLY

How to Set Axles.

L. VAN DORIN.

In a recent communication we explained our method in getting the proper length for any given track. As we attach more importance to proper set than the length, we will now try to explain a method for properly setting.

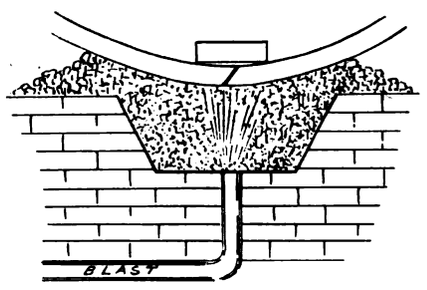
The accompanying engraving shows a cheap device that any blacksmith can make. A board is held in the vice with the straight edge toward you. Line A is a permanent gauge mark, running from the notch S for the full

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length of the board and always represents the bottom of the axle in adjusting the axle set. The dotted lines crossing the board represent chalk lines. The distance between notch S and chalk line C is the length of the axle between collars. The distance between B and C is one half the diameter of the wheel, while the distance between C and D is the length of the spindle.

Now, for convenience, we will say we want to set a 2-inch axle. We measure up from base line A half the diameter of axle at chalk line C. In this case it would be one inch. Here make a prick mark with point of knife. Then measure up on chalk mark B half the diameter of the axle plus the dish in the wheel, which if ½ inch will make the distance 1½ inches. Here make another prick mark. Now take the little board at Y, place it on board X so it crosses all the chalk lines, and its straight edge touches the two prick marks at B and C. Now make another prick at the point where it crosses the chalk mark at D. This mark locates the center of the point of the spindle when it is properly set to stand the wheel on a plumb spoke. Hence we make a prick mark below that, the distance of half the diameter of the spindle point, which locates the bottom of the point.

We now adjust the axle set at Z, see slot H, and thumb nuts FF, so that when part E is placed in notch S part O should just touch the base line at C and the lower prick mark at D. Now set the axle so that when part E of the axle set rests on bottom of one spindle at the collar, part O will fit the bottom of the opposite spindle and wheels will stand on plumb spoke. The other side of the axle set is intended for the back and front of the spindle. This rule holds good regardless of the taper in the spindle, and applies to all axles, whether of wood or iron.



ANOTHER METHOD OF WELDING WIDE TIRES

Now let us have other methods of properly setting axles. Surely there are other readers who have original methods for getting the proper set. Only by comparing methods can we know which is best. The question is worthy of discussion, so let other readers give their opinions on this matter.

A Handy Tool for Making Toe Calks.

WILLIAM A. SWATLING.

The accompanying engravings show a very handy anvil tool which I use when making toe calks. As shown, the tool consists of a regular anvil hardy with a lug welded to one end of it upon which to draw the prong of the calk. The finished tool is shown at A, while B shows a finished calk. At E is shown the method of forming the little point on the calk. The steel is tipped slightly toward you with the back highest. In forging the prong get it as near as possible to shape as shown in the sectional view at D.

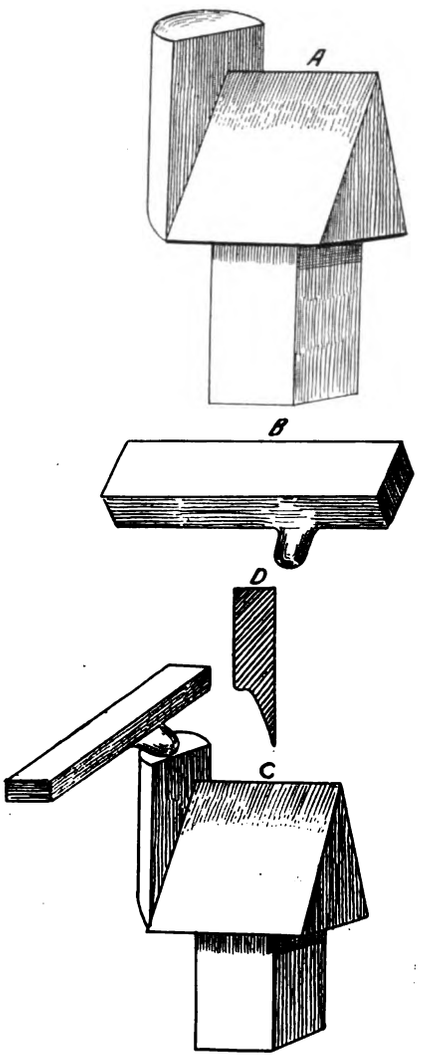
I find this tool a great help, and I can form calks much better and quicker than by the old way.

Equipping the Power Shop and Welding Wide Tires.

WUN HI.
Australia.

From Australia to America is a long way, and by the time you get this most of what I refer to will be forgotten, but I want to say a few words regarding the April issue of "Our Journal." The article by Tom Tardy's Brother on page 167 took my fancy, and puts the other side of the question very nicely. Although it is evidently a burlesque on the modern power shop, the moral stands out clean and plain to those who read between the lines. The writer of that article is no fool, and what he is trying to convey to us is that we are apt to let our ambition to run power shops run away with our reason and make us buy machines that we do not really want. I am thinking of putting in some power myself before next summer, and Tom Tardy's Brother has done me a good turn in drawing my attention to most of the evils of such a proceeding. I believe myself that most men get the power fever and buy what they do not want and sometimes what they cannot afford. Anyhow, before I equip my shop with machinery I am going to copy that letter and learn it by heart. With the knowledge contained in that letter, and average brains, a man ought to be able to select his machines wisely, getting only the very best as far as possible, and not buy any until he is sure that he can keep it employed at least nine months in the year. I know it does not pay to have machines standing idle in the shop.

Mr. T. J. Tramle on page 164 says he is right at home welding tires. I think he is about as far away from



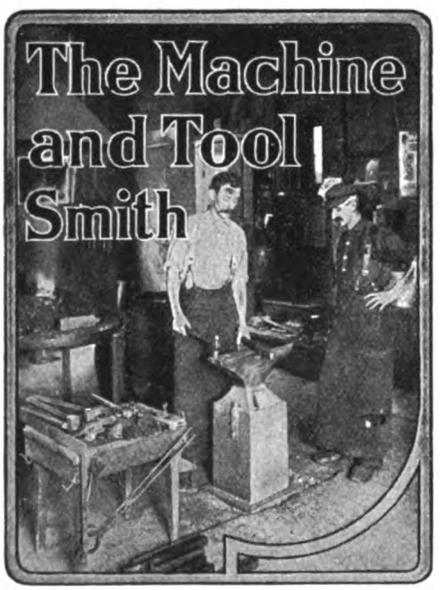
THE MAKING OF TOE CALKS IS SIMPLIFIED BY THIS TOOL

home as he can get, if he takes three heats to weld a tire. In this hurry and bustle age a man that can't weld a tire in one heat is out of date, especially in the busy season, when you have no time to scarf them. Just fancy our eight fires welding tires three heats to each weld, twenty-four heats to eight tires. My old boss would butt his head against the anvil if he saw a man at that game. I would like to tell Brother Tramle how I weld them if it will not take up too much of your valuable space:

Take your tire and give it the right lap without scarfing. Now heat it red hot and then just clip off the edges with a sharp chisel. This is a lot quicker and better than scarfing with a fuller. Now stand your tire up in the fire and place a fire brick on top

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of the scarfs. A common building brick will do just as well, only it does not last as long as the fire brick. Now start with a steady blast, and if you find the edges getting hot before the center, stop the blast a few moments until it shows the same heat all over, then blow up again and you will get a good heat. You can weld any wide iron this way in one heat if you have a couple of good hammermen that know their business. Let the edges spread out as much as they like and trim off with a sharp chisel. I once had some bands 8 by ½ to weld up, and I did them with the brick and had no trouble in welding them in one heat. The main point is, don't hurry. Give a wide, thin axle a very slow, steady blast. Don't force it; coax it.



The manipulation of the metal has so very much to do with the result that too much care cannot be expended in the working of a piece of steel. A piece of steel worth fifty cents in the bar may be worth dollars or nothing in the tool, depending entirely on the worker and his care. R. J., Iowa.

A second heat, when welding steel, should always be taken. It requires but little time and when a perfect weld is required on steel it will pay in the end. The second heat is, of course, a welding heat, and sharp, quick blows should be delivered until the piece is welded and joined solidly. AN ENGLISH SMITHY.

To water anneal a piece of steel, heat it evenly to a cherry red and allow it to cool in the air until it will no longer char a pine stick, then cool it in soapy water. This way of annealing a piece of steel very often proves valuable when the metal must be used immediately. A. C. B., New York.

Even heating is a part of the instructions every time steel is to be treated by heat. No one in giving instructions in steel working ever said to heat unevenly or carelessly. An even, careful heat in steel is half the battle in successfully working the metal. These instructions on heating stand out so forcibly when reading any work on steel manipulation that it would seem that nothing but deliberate disregard of proven methods could excuse careless or uneven heating. B. W. O., New York.

Pensioned After Nearly Fifty Years of Service.

Mr. George Nicholson, the veteran blacksmith of the Jamesville shops of the Chicago & Northwestern Railroad, was retired on the first of July and will receive a pension for the remainder of his life. Mr. Nicholson passed the seventieth milestone in life on March third. He entered the employ of the Northwestern road at Chicago in 1857, and with the exception of a few years spent in farming, he has been on the company's pay roll a greater part of the time since. The honor conferred upon Mr. Nicholson is well deserved.

A Practical Talk on Drill Steels.

J. C. LAMONS.

The cause of the drill steels cracking may be traced to three causes: first, poor grade of steel; second, poor quality of coal, that is, coal containing a large per cent of sulphur, which is very injurious to any quality of steel; and third, improper forging heat. To give a fixed rule in forging and tempering drill steels is hardly practical, as there are so many things to be taken into consideration. The quality of steel varies, and often the poorest grade is supplied, so the smith has several things to content with. Again, the same degree of hardness will not answer, as the substance to be drilled varies in degrees of hardness. We would not use the same degree of hardness in drilling granite as we would in soft limestone or marble. The grades of steel usually supplied the smith to make drill steels require a high heat to forge same, but a very low heat to harden, not a "cherry red," but a "dull red."

The method generally followed by tool smiths with the steels usually supplied quarries and mines is as follows: Heat the steel slowly, but work at a high heat, never allowing steel to sparkle or burn. After bit is properly forged or dressed, allow steel to cool and then temper to required degree of hardness.

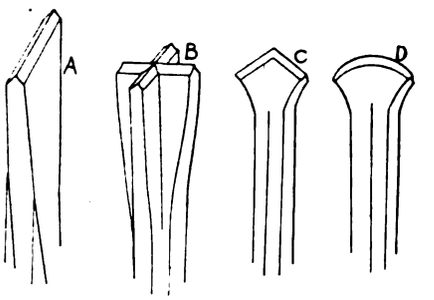
Several methods are practiced in tempering. One of the best is to stand the cutting part of the bit only in a tub, or, better, a tank of salt water, until cool, then draw the temper to a straw color. One of the best grades of coal is "Blossburg," mined at Blossburg, Pa. "Gas house" coke is also good, and is preferable when the best grades of smithing coal are not at hand.

Bending a Number of Small Rings Without Special Tools.

H. J. M.

A very simple way to bend a number of small rings is to forge a pair of tongs as shown at A in the engraving. The size of the jaws will, of course, vary according to the size the finished rings are to be. The tongs must also be made especially strong and provided with a ring so as to hold the stock securely.

To use these tongs measure your stock and cut accordingly. Then heat the bar for its entire length and grip it in the center with your special tongs. Now proceed to bend the heated stock around the groove as shown at C.



DRILLS DIFFER IN SHAPE ACCORDING TO USE

Proceed with the bending gradually so as to get the ring even and uniform and to have it free from kinks. After gradually bending the bar to conform to the tong jaws and hammering the stock down well into the groove, open the tongs and release the ring. It may now be welded.

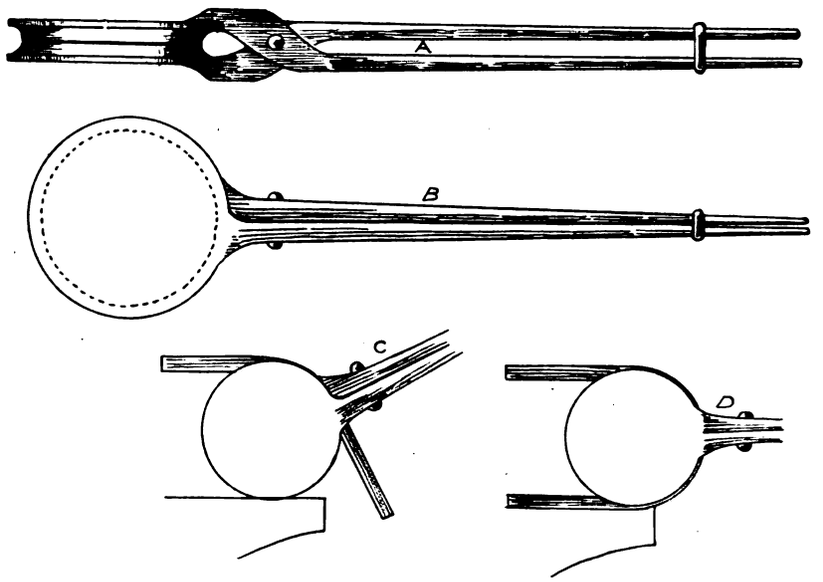
It would be well to make the ring slightly larger than required so as to allow for scarfing and welding. However, if by mistake no provision is made for this, a piece can easily be welded in to make the ring the required size. By this simple method rings of almost any size except very large ones can be turned very quickly and in any quantity. Eye bolts can be made in this way by welding a shank to the ring after welding or by welding the end of the shank between the ends of the ring before they are closed.

Adjustable Tongs for Holding Several Sizes of Work.

C. A. CARTER.

Mr. A. D. Gilbert on page 211 details some excellent styles of tongs for handling smith work, but fails to mention a very handy and serviceable

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THE BENDING OF SMALL RINGS AND EYEBOLTS BECOMES EASY WITH THESE TONGS

style of tongs for holding several sizes of work. These tongs, or, rather, rightly speaking, the attachment for tongs, is practical, easily handled, and quickly adjusted. The illustration shows the attachment forming a V-shaped jaw; it may, however, be made with a flat jaw, or round, as may be required for the work in hand. The extra jaw is attached to the tongs by means of a bolt which is passed through the shanks of the extra jaw and through the hole in the jaw of the tongs. The various adjustments for different sized stock are made by passing the bolt through the hole corresponding to the size stock to be worked.

This attachment may be applied to most any style of tongs, and is very easily made. Take a piece of flat stock of suitable size and cut in the shape of a T. Now split the piece from each end as shown at X, and forge to shape. Spread the shanks to the proper width for the jaw of the tongs and punch holes to receive the bolt for holding the extra jaw firmly in the tongs.

Other tongs to which I would call readers' attention are those illustrated at A and B. These are both used on angle iron, not as Mr. Gilbert's tongs, which are illustrated at G in his illustrations, but for gripping the sides and for turning and manipulating long bars of angle iron. The tongs at B are for gripping the angle bar in a reverse position. If there are any other styles of tongs for special uses, let us hear about them. The doing of good work with dispatch depends in a great measure upon the tongs used to handle the metal. To hold the work firmly and without allowing it to wobble or move sidewise in the jaws is the office of the ideal tongs. The hand should be able to grasp them easily and without fatigue. They should be strong and yet not unwieldly.

A One-Man Association Raises Prices.

J. S. CORNWALL, JR.

The accompanying list of prices I made up myself and intend to charge. I am alone in this and as there is no association here, I thought I'd be the whole thing myself. Five miles north and east and seven miles south they are all shoeing for 20 and 40. They refused to raise the price, so I am all alone. I don't know now how I am going to come out, but I thought I would take a chance.

Horseshoeing.

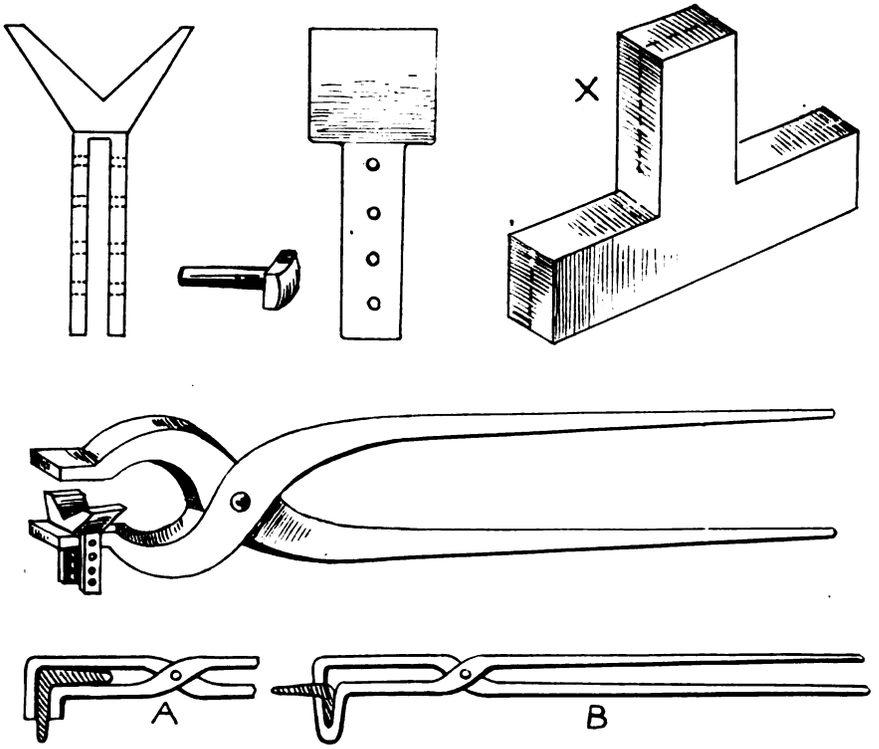
New Shoes, each	$ .50
Resetting "	.25
Stallion Shoes, each	1.00
Stallion Shoes, Reset, each	.75
Bar Shoes "	.75
Neverslip Shoes "	$ .65 and .75
Nevership Calks "	.05
Neverslip Shoes, Reset "	.25
Handmade Shoes "	.75
Toe or Side Weight "	.75
Leather Pads and Packing, each	.25
Paring Horses' feet, each horse	.25
Shoeing Mean Horses and Bronchos, where we have to use ropes, extra	1.00

Wagon Ironwork.

Ironing Front Bolster	$1.00
Ironing Hind Bolster	1.00
New Bolster End Irons	.30
" " Stake Irons	.50
1 Pair Bolster Plates	1.50
1 Sand Board Plate	1.00
4 Tires, cut and reset	2.50
4 " set	2.00
Boring and Bolting Wagon Tires, per set	1.00
Four 3-inch Tires reset	3.00
Rake or Seeder Tires reset, each	.50
1 Set 3-inch Tires, new	12.00
1 " 1¼-inch " "	8.00
New Rub Irons, each	.35
Old Irons replaced on tongue	.75
New Hammer Strap	.35
New Circle Post	.25
New Tongue Cap (put on)	.50
New " Rod	.35
New Wagon Wrench	.35
Hub Bands, each	.25
King Bolts, each	.50
Box Strap Irons (put on), each	.25
Seat Springs, each	.75
Box Rods (put on), each	.20
New Center Clips on Singletrees, each	.25
New Ferrules " "	.15
Seat Hooks, each	.15

Buggy Ironwork.

Buggy Stubs put on, up to 1 inch	$7.00
" " " " 1¼ inch	8.00



THE EXTRA JAW MAKES IT POSSIBLE TO HANDLE MOST ANY SIZE STOCK

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Axles set, each	1$.00
4 Buggy Tires set	2.50
Resetting one Tire	.65
4 Buggy Tires, new	6.00
1 " " "	2.00
Buggy Spring welded	.60
Irons Replaced on Shafts	.50
Shaft Iron welded	.35
Shaft Shackles, each	.40
" Eyes, "	.50

Sharpening Disks, 7-ft.	$2.00
" " 6 "	1.75
" Roller Coulters, each	.25
" Harrow Teeth, each	.01
" Harrows, 90 teeth	2.25
" 2 Planter Shoes and Polishing	.75
Polishing 2 Planter Shoes	.35
Pointing and Sharpening 4 Corn Plow Shovels	2.00

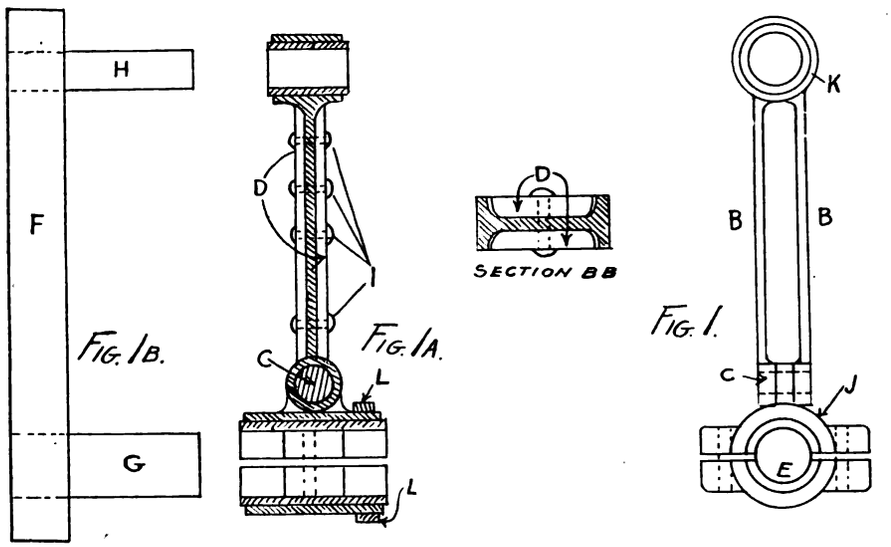


FIG. 1B. FIG. 1A. FIG. 1.

THE PISTON OR CONNECTING ROD MAY BREAK IN ANY OF SEVERAL PLACES

Buggy Pole Irons replaced	.75
" " Braces, new	1.25
" " " welded, each	.40
" " Eyes, each	.50
New T Hammer Strap, each	.65
Axle Clips (put on), each	.20
Spring Clips " "	.25
1 Buggy Singletree Clevis	.25
1 " " Bolt	.10
1 " " Ferrule	.10
1 " " Hook	.10
4 " " Spring Hooks	.75
1 Buggy Clip King Bolt	1.00
Buggy Reach, iron, welded	.50
New Bow Socket Rivet (put in)	.15
New Prop Top Nuts, each	.15
Repairing Chains, per link	.10
Chain Grab Hook	.50

Plow Work.

New 18-inch Lay Crucible Cast	$4.50
" 16 " " " "	4.00
" 14 " " " "	3.50
Eyebolts, each	.15
Harrow links, each	.15
Links and Eyes together, each	.25
New Landside Plate	1.25
Polishing and Sharpening Plow, complete	1.50
Pointing and Sharpening 18-inch Lay	.75
" " " 16 " "	.65
" " " 14 " "	.60
Polishing Disks, 8-ft.	2.75
" " 7 "	2.50
Sharpening Disks, 8-ft.	2.25

Pointing and Sharpening 6 Corn Plow Shovels	2.00
Sharpening and Polishing set 4 Shovels	.75
" " " " 6 "	1.00
Polishing set 6 Shovels	.25
" " 4 "	.25
Sharpening Stalk Cutter Blades, each	25

Sled Work.

New Cutter Shoes, per pair, put on	$3.00
Cast Runners for Bobs, put on, each	1.35

Mower Repairs.

Sharpening Sickles, 4½ feet	$ .35
" " 5 "	.40
" " 6 "	.45
Filing Sickles, 6 ft.	.75
Putting in Section	.05
Welding Sickle, Mower	.65
" " Binder	.75
" Pitman	.50
Putting Straps on Wooden Pitman	.25
Putting in new Guard Plates, each	.05
Putting on new Sickle Head, each	.25

Automobile Repairs.

E. F. LAKE.

There are many parts of the modern automobile that are liable to fracture, bend, or give way while on the road, and the village or country blacksmith is usually called on to make the necessary repairs. Some of these repairs, of course, can only be temporary ones, but many can be made permanent if the smith has the proper knowledge of the work which the part has to perform.

The motor or engine is probably the cause of more stops than any other part of the automobile, and these are sometimes caused by very simple things, yet are very difficult to locate, especially if one does not understand the mechanism of the car. For instance, the end of the spark plug, which is in the cylinder, may become covered with a carbon deposit, in which case all that is necessary is to remove the spark plug and clean the points by scraping with a knife, after which the spark which ignites the gases will occur readily and perform its work. Or perhaps the wires, from the battery or magneto may get crossed and wear through the insulation. In this case a little rubber tape—such as is used on bicycles—if wound around the bare wires will effect the needed repair. Should the carbureter, which supplies the engine with gas, become clogged up with road dust and refuse to work, it can sometimes be cleaned by flooding with gasoline, but at other times it may have to be taken off and apart. This can be done with a small wrench, when it can be easily and thoroughly cleaned. Sometimes the pipes leading from the gasoline tank to the carbureter become clogged, making it necessary to clean them out. At other times a stop is caused by more serious things, which require considerable ingenuity and mechanical knowledge on the part of the smith to repair.

One of the engine's parts that is liable to give way is the connecting or piston rod. When this is broken the bolts which hold the engine cylinder to the crank case will have to be removed, the pipes, wires and other things which are attached to the cylinder disconnected, and the cylinder removed. The piston can then be removed from the cylinder, and by taking the piston pin out of the piston the connecting rod will come out. The other end of the connecting rod can

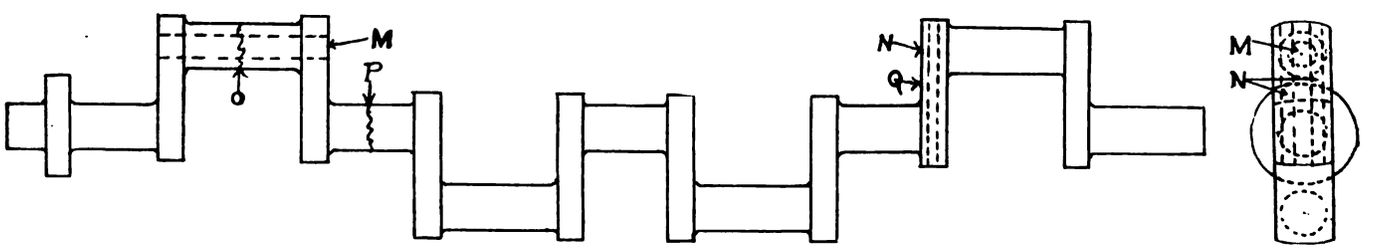


FIG 2 FIG. 2A

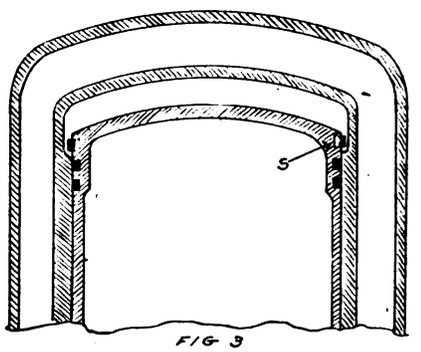
A REPAIR TO A BROKEN CRANK SHAFT MUST BE VERY CAREFULLY MADE, AS LITTLE SPACE CAN BE SPARED FOR EXTRA METAL

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then be uncoupled from the crank shaft by removing the bolts which hold the cap on. See E, Fig. 1.

Figs. 1 and 1A show the usual design of these connecting rods, which are of I-beam section, as shown by section BB. If the break occurs near the center, as shown at A, Figs. 1 and 1A, it can be repaired by fitting two strips of good quality steel between the flanges of the rod, as shown by D in Fig. 1A and section BB. The proper length of the rod should be ascertained and a simple jig made, as shown in Fig. 1B, by taking a flat piece of steel F of sufficient size to insure stiffness, and drilling two holes of the correct size to hold the round pieces of steel G and H. These should be of a size that will make a tight fit in each end bearing of the connecting rod and square with the piece F. The pieces G and H must be parallel and in line with each other. The use of the jig is absolutely necessary, as $\frac{1}{8}$ of an inch variation in the length of the rod makes a great difference in the running of the engine, and if the bearings are slightly out of line, the rod will bind and stick. After fitting the pieces DD, the rod is slipped on the jig, the cap E tightened up by its bolts to insure rigidity, and the holes for the rivets I, Fig. 1A, drilled. It can then be riveted before removing from the jig.

If the break occurs near the end of the rod it will not be possible to use the strips D. The joint as shown as C, Fig. 1 and 1A, is the best method of



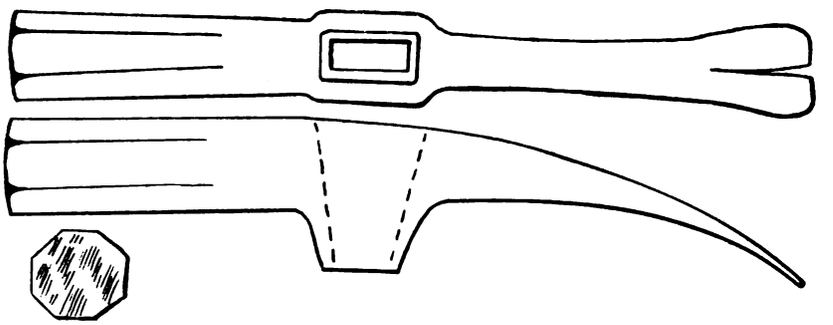
A CRACKED CYLINDER IS BEST REPLACED WITH A NEW ONE

repairing it. This can be done by forging the connecting rod so a hinged joint can be made and after fitting the joint it should be fastened on the jig, after which the hole for the pin is drilled and it is riveted or bolted before removing from the jig. This joint, if properly made, makes the connecting rod nearly as strong as the solid rod, and one manufacturer is using it, as it is impossible to get the cylinder absolutely perpendicular with the crank shaft, and this joint allows the connecting rod to give enough to make up for the discrepancy.

It is almost impossible to weld these connecting rods together and retain the proper length between centers of bearings and at the same time keep them perfectly in line and parallel. Therefore, these joints are the easiest and best way to make the repair. Then again, some automobile makers use for their connecting rods a steel that is very difficult to weld and it can only be done successfully by the aid of electricity, or the acetylene blowpipe, or the thermit process of welding.

Sometimes a break occurs at the bearings, as shown at J and K, Fig. 1. These can best be repaired by running a band around the outside of the bearing and riveting it to it, as shown at L, Fig. 1A. But this can only be considered a temporary repair, as it will soon give out and the machine will need a new connecting rod.

Another important part of the engine which is liable to give way is the crank shaft. A four-cylinder crank shaft is shown in Figs. 2 and 2A. This is the one which is most commonly used. One, two, three, or even six or more cylinder crank shafts are constructed on the same principle. As the crank shaft is made as light as possible and to withstand the enormous thrusts put upon it, there is no surface on which extra metal can be welded, riveted, or bolted. Were any metal to be added, it would come into contact with some other part of the engine and stop it. Repairs to the crank shaft can only be of a temporary nature so as to enable the car to reach a place where a new crank shaft can be procured. Breaks are liable to occur on the crank pin for the connecting rod, as shown at O, Fig. 2, on the bearing as shown at P, or on the web which connects the bearing with the crank pin, as shown at Q. To repair these it is necessary to take the crank shaft out. This can be done by loosening the bolts and taking off the lower half of the crank case, after which the connecting caps must be unbolted; the flywheel removed, and the transmission shaft disconnected. Then the crank shaft can be removed. To repair the breaks as shown at P, a hole should be drilled at M, about two thirds of the diameter of the crank shaft, and a tight pin, of the best quality of steel in the shop, driven in. The hole should be countersunk on both ends and the pin peened into the countersink to prevent its coming out. If the break occurs in the web, as shown at Q, two holes should be drilled, as shown at N, Figs. 2 and 2A, the holes countersunk at both ends, and the pins driven in and peened into the countersink the same as the one at M. This will enable the engine to run at slow speed until the car is brought to a place where a new crank shaft can be procured.



A WELL-SHAPED TACK HAMMER HEAD THAT PRESENTS SIDE-LINE POSSIBILITIES

Sometimes the cylinders crack from the high explosive pressure. As these are of cast iron, repairs are impossible, but if the engine has more than one cylinder the connecting rod in the cracked cylinder can be removed, the piston pushed up in the cylinder until the top piston ring expands into the larger opening at the top of the cylinder as shown at S, Fig. 3. This will prevent the piston from falling down and interfering with the crank shaft, and the automobile can be run by the remaining cylinders until this one can be replaced with a new one.

There are other parts of the modern machine that are liable to break and require the services of the blacksmith, and these will be taken up in the future, as space forbids the dealing with them in one issue.

An Adz-Eyed Tack Hammer.

ROBERT W. LAWSON.

The accompanying engraving shows a very neat design for an adz-eyed tack hammer. The head is well balanced, the claw has a good curve, and

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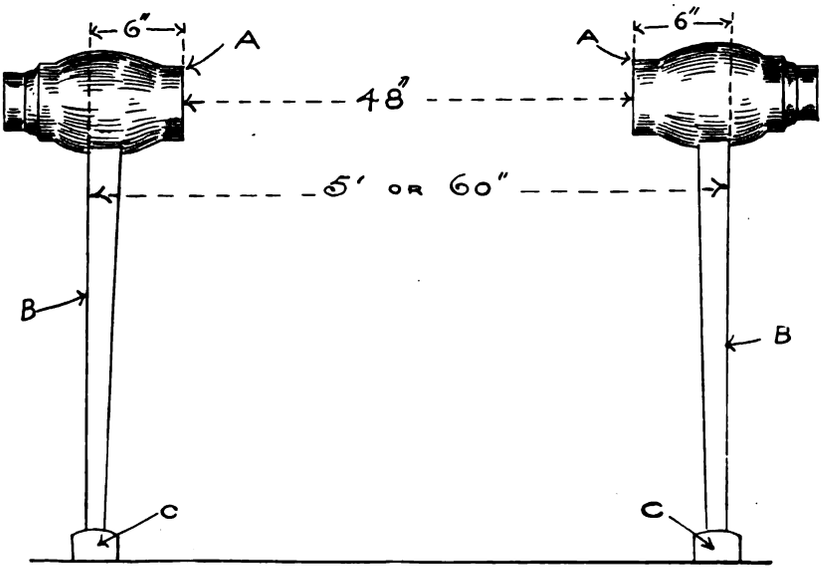
the general lines are good. The stock may be octagonal of the size the head is to be and drawn down to form the claw and the eye part. The tapering eye enables a good stout handle to be fastened in securely. The face should of course be slightly rounded to avoid the possibility of cracking as much as possible. The claw shank should be tough rather than hard, while the edges of the claw should be sufficiently hard to withstand rough usage. These hammers can be turned out at a reasonable figure and turn spare moments into good profit.

How to Get Length of Axle for Any Given Track.

L. VAN DORIN.

By the aid of the accompanying engraving you will, I think, easily understand my rule. Simply subtract the distance from the face of the spoke to the butt of box of each wheel from the track you wish your wagon to have, then weld your axle so the length (whatever that may be) between where the butts of the boxes come on the axle will be what you have after subtracting.

The rough sketch represents a five-foot track from out to out. Of course, to be very precise you can make allowance for projection of rim outside of spoke and weld axle that much shorter. You will observe we have taken off 6 inches for each wheel from the five-foot track, leaving the axle four feet between collars.

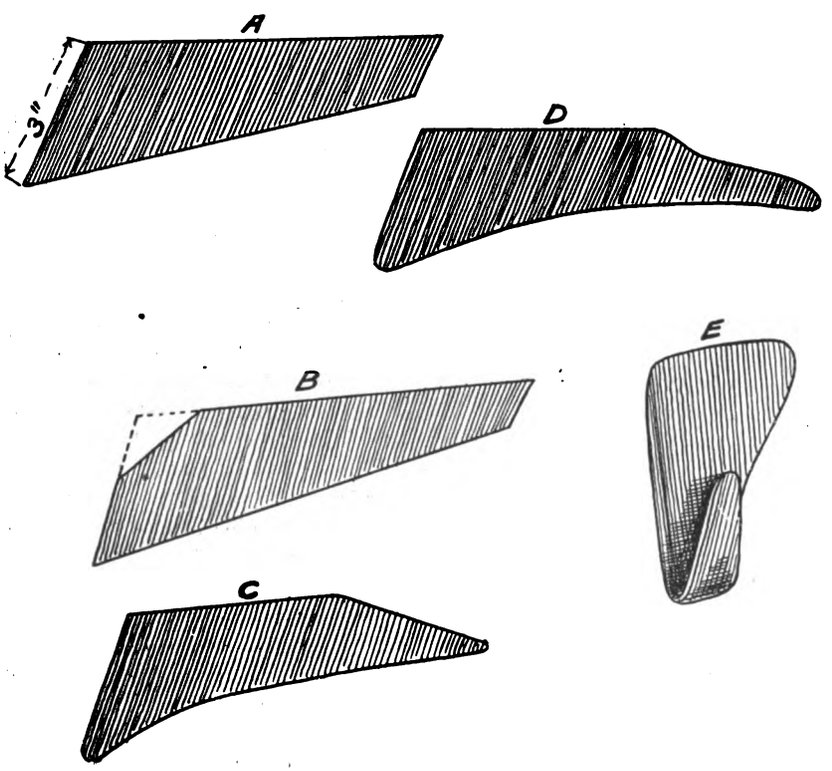


HOW TO GET THE LENGTH OF AXLE FOR ANY GIVEN TRACK

A plumb spoke is generally supposed to be the proper thing for a wagon to stand on, and when we say a plumb spoke, we mean, of course, the face of the spoke. This makes the face of the opposite spokes parallel with each other. A represents butt of box, B face of spoke, C the rim. The length of the axle between collars is 48 inches, while the track is 5 feet, or 60 inches.

A Letter to American Blacksmith Readers, from a Reader in Ireland.

I would like to help in making "Our Journal" interesting to Irish readers at home and abroad, as well as to others. I see more ways than one that it could be made so, a few of which I would like to suggest here. One way in particular—What nicer Christmas present could an Irishman send home to his brothers, cousins, or his aged father, who is past his labor and would like something interesting to read, or his old "boss," or some other blacksmith friend he has left behind him in the old land that he intends to come back to sooner or later? Believe me, it will interest all these people, especially if you send in your article to it now and then, or a new kink. It will be the same as a letter from you, even when you, yourself, forget to write. It will cost you little, and all you need do is to order it as you order your own. I am sure THE AMERICAN BLACKSMITH will be very willing to do the rest for you, as they do for me and everyone else. I get the paper regularly every month. I am much interested in the Journal as a reader, and it is such a torch that I would like its light to shine strongly over here. Although Ireland is not said to rank amongst the countries that produce great iron work, yet you will find here some fine specimens of craft work. For instance there is one piece of wrought iron work I would like to mention. It is the entrance gate to Slane Castle in the County Meath. It is now twenty-five years ago since I saw it. I made a sketch of it then, took down the dimensions of it, and got all its history, but I have lost it since, and it is so long ago that I have forgotten most of the particulars of it. I came on it by chance one day. I was struck by its dimensions and workmanship more than by its design. I stopped

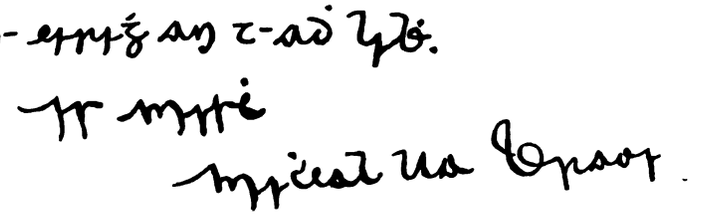


THE VARIOUS STEPS TAKEN WHEN POINTING A PLOW LAY WITH ONE WELDING HEAT

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to take particulars, when an old man residing in the locality came by and told me it was made on the spot by a man named Kavanagh and his two sons many years ago when the old man was a boy. Kavanagh and his sons have, I believe, long since gone to America, like so many good Irish blacksmiths that I have known well. I always considered this gate a great example of handwork of its day, for I'm sure they had none of the appliances then that we have now. I'm sorry I have not the dimensions to give, but perhaps some one who may read this has seen it and can give full details of it. I can not vouch for the truth of its history, of course.

One word more to you young men especially. Keep a memorandum; enter everything you want to remember. Of course, you need not lose a heat by doing so, but you will find plenty of leisure in which to do it. Learn to draw if you cannot do so already; make a rough sketch of any intricate job you want to do, with plain figure dimensions. It will enable you to see the thing finished before it is done, and save your mind when you may want it for something else. In any leisure time you have learn to draw to scale; it will enable you to see the proportions of your work. Small work may be drawn to natural scale. Enter all dimensions, measurements, and orders, and if you have learned shorthand, all the better. Don't overtax your memory; save it all you can, and this is one of the ways you can do it. It will only take a few minutes to enter your memos, and it may save you hours, sometime, of puzzling your brain to think of things, and also save many mistakes. To have a thing entered in your notebook is the same as making a thing in your slack time, and putting it in the store until you want it. Cultivate a taste for reading, especially good books, and employ other minds to develop your own.



OUR IRISH READER SIGNS HIS LETTER AS ABOVE. CAN YOU READ IT? IF SO, LET US KNOW

How to Point a Lay With One Welding Heat.

F. E. POBST.

Take a bar of lay steel 6 by ¼, and cut it in pieces as at A. Put the broad end in the fire, and then shape it as at B. Then draw with that heat until it is very thin on end, and is drawn about 2 inches back. Also draw the piece so that it will form the throat of point or lay when done. Now heat the small end, and draw down to shape as shown at C. Always pound the edge on the land side of the point, for this will make it thicker than the other side, and when this is accomplished you will have a piece shaped as at D.

Now bend the piece as shown at E and fit to lay with large side on top. Now place it in a large, clean fire, heat, and without removing and with a 2 or 4 ounce iron hammer, weld down in the fire thin edges on top and bottom. Then remove the tongs so as to get the lay well in the fire. First strike the lay heavily on one side and then on the other, using plenty of borax all the time, until the whole point is in good welding shape.

Remove it from the fire, and give it quick blows with a small hammer on the throat, welding always in the center and working toward the edge so as to force all of the dirt out. Then work over to the land side to a point underneath and on top. Cut off and shape, leaving the breaker lays with a sharper point than the stubble lays and be sure to point the throat down to a level.

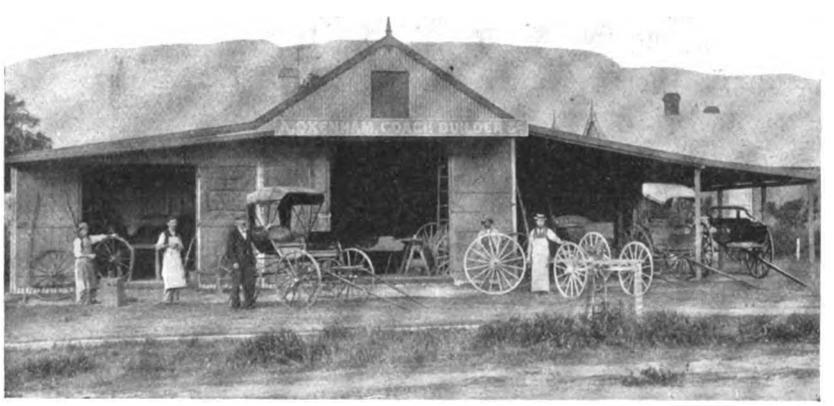
Practice, of course, makes perfect. The smith must consider that first efforts are not always indicative of best results. After a trial or two, this method will recommend itself.

A Carriage Shop of South Africa.

A. OXENHAM.

I do not know that I have anything very interesting for your readers, as I work alone, with the exception of a painter, and I do not, therefore, go in for much new work, as this does not pay except to "fall back on." Being woodman, blacksmith, and everything in turn, as well as my own "scribe," you can imagine my time is pretty well occupied. I have been in business for about twenty-four years; have always made a practice of doing a first-class job and always intend doing so even though I lose custom through others cutting prices and turning out indifferent work. I should find no satisfaction in sending out poor, "jerry-built" vehicles or repairs. I may say that I am a great believer—in fact, a regular crank—in having a place for everything and everything in its place. One thing that surprises me greatly in the pictures of the shops in the United States is this: None appear to have any shed or veranda space for repairing, or for the protection from the weather of vehicles while under repair, and this I find a great convenience.

My shop as shown in the picture extends about fifty feet back, blacksmith shop in the rear, with my dwelling house in the background. The picture also shows our mountain, Plata Berg (or Flat Berg), 2,300 feet high above the town, or about 7,500 above sea level; so you see we are considerably elevated. I am standing in the foreground with the long apron on. I have all kinds of machines and up-to-date appliances, mostly made by myself. I have no engine, but am a great advocate for machinery if you have sufficient work to warrant its use and to keep it running.

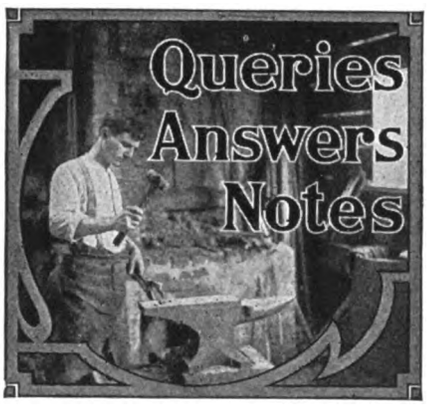


A CARRIAGE SHOP OF SOUTH AFRICA 5,000 FEET ABOVE SEA LEVEL

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Advertising the Smith Shop.

A man won't remember you, nor your shop, if he sees your sign but once a year; he may possibly remember you, if he sees it once a month; but if he sees it once a day he *must* remember you. If your sign gets the buyer's attention when he wants to buy something which you have to sell, it does all that advertising can or is expected to do. Does the sign over your shop door do this? How can it? To get first chance to sell, you must get your sign in where the demand for your goods and work originates—and keep it there. A would-be customer will keep a worth-keeping calendar and be reminded of you every day. The AMERICAN BLACKSMITH Calendar for 1908 is a worth-keeping calendar. Watch for special announcement. A worth-keeping calendar given to a worth-keeping customer will result in worth-keeping business.



The following columns are intended for the convenience of all readers for discussions upon blacksmithing, horseshoeing, carriage building and allied topics. Questions, answers and comments are solicited and are always acceptable. Names omitted and addresses supplied upon request.

Wants a Spoke-making Machine.—Please tell me how to make a machine to make spokes. I have a saw mill plant and a back-geared lathe with slide rest. Can some brother tell? WM. TODD, Australia.

Power—Does it Pay?—I want to ask some of the craft if it pays to put in power. I would like to know, as I have been thinking about it for some time, and want to install power. E. F. BARNES, Kentucky.

Wants to Put on Rubber Tires.—I would like to hear from some good, practical craftsman as to the best way of fastening rubber tires on wheels. Which is the best method? J. W. BARNES, North Carolina.

A Cold Tire Discussion.—I would like very much to see the cold tire proposition discussed more fully in the columns of "Our Journal." I am thinking of purchasing one of these machines, and want to know. F. C. STRACKE, Nebraska.

Wants to Weld a Crank Axle.—Can some brother smith give me advice as to the best way of making a crank axle? Are they usually welded at the crank, or where is the weld made? I would also like to know the best method of scarfing steel axles. BLACKSMITH, New Zealand.

Wants Something to Hold Broken Castings.—Will some brother of the craft give a description and plan for making an adjustable clamp for holding broken castings when brazing them? I want something that will hold the casting firmly while it is being heated—a clamp that will adjust to and hold several sizes and shapes of work. W. M. B., New York.

A Question on Wooden Axles.—I would like to ask one question in regard to W. A. Short's article on the wooden axle. He gives every measurement except the length. Now, I would like to have him give the exact length of the narrow-gauge wagon axle; and is there any difference in a 3½ or 3-inch axle in length? Please, answer, brother. C. W. METCALF, Iowa.

Tempering Small Springs.—In answer to Mr. P. Larson in regard to tempering small springs, I would say that the best medium that I have ever used is beef tallow. Forge your spring and get it in proper shape. Then heat, lay it down and let it cool. Now reheat to a dark cherry red and plunge into the tallow. Then hold over the hot coals till the oil catches fire. Then bury it in the coal cinders till cold and it will be ready for use. C. W. METCALF, Iowa.

Brazing and Tempering.—In regard to J. H. S.'s inquiry, I would say to braze copper wire I always use brass. The brass will melt much quicker than the copper. For tempering cold chisels for cutting rails, first, don't work too hot, draw to desired size and shape, and then reheat and let cool gradually. When cold, heat to as low a heat as the steel will take temper, and then dip in your bath and grind. Then heat to a dark cherry red, plunge the whole thing and leave just enough heat to draw the temper, and draw to a light pigeon blue. This will give proper temper. C. W. METCALF, Iowa.

Appreciates "Our Journal."—There is always something to be found of real value in THE AMERICAN BLACKSMITH which one is not able to find elsewhere. The chapter on tongs by A. D. Gilbert in the issue for June is about the best of its kind it has ever been my pleasure to look at. Mr. Gilbert deserves much credit for the skill set forth in his chapter on the education of the iron worker. If Brother C. G. W. will look on the advertising index of the June issue he will learn just where to have his rasps cut. There is more information than imaginable in the advertisements. I find such to be the case. JOSEPH EBERLE, New York.

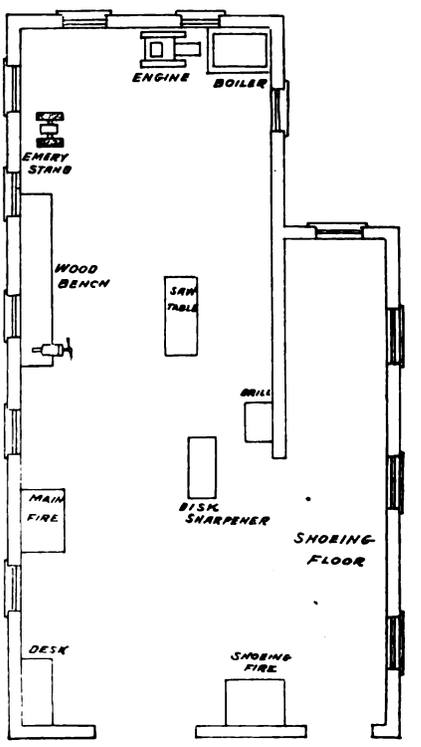
From a Mason.—Have been behind the anvil over 25 years in one place. Have not had a chance to learn much up-to-date work, as this is a little country town. The talk on steel and on shoeing has been of much importance to me. I have no track horses to shoe, but crooked and crippled feet come in sometimes. One subscriber said he was a Mason and attended Sunday school. I wish more of the craft could say that. I don't think I have missed more than three Sundays in twenty years from school, and I have filled all the offices in the Blue Lodge except secretary. I think your paper is of great value to every young smith. AN OHIO SMITH.

A Power Shop of Ohio.—I have a nice trade, and all the necessary tools to carry on a general smithing business. The first tools I ever bought were a blower, an anvil, a drill, and three kegs of shoes. I then rented an old shop and opened the doors the ninth day of June, 1901. The first day I put on 22 shoes and I thought I was in clover. I did well all that week, but then came a siege of rainy weather. It was so wet for six weeks that the shoeing business was knocked on the head. There were some days that summer that brought me less than 25 cents a day. I shut up shop till winter, when I hired a driver, and when the rush came I hired the second man.

The accompanying engraving shows a plan of my shop. THE AMERICAN BLACKSMITH has been a great help to me in building up my business, and I think a great deal of it. Lots of smiths are giving their prices, so I will send a partial list of mine.

New shoes	$1.50
Resetting	.80
Bar shoes, each	.75
New plow lay	3.50
New lister lay	3.50
Pointing plow	.75
Wagon tongues	2.50
Buggy tongues	2.50
Box, hand-made	12.00

I give credit only when money is sure every month. All others must pay cash if they trade at my shop. That is my way of doing business. C. O. MUELLER, Iowa.



A POWER SHOP OF OHIO

A Power Shop Pays.—I will just say for the benefit of some craftsman who hasn't power if you want to prosper in blacksmithing, order some power at once. I will give a description of my shop. It is 20 by 96 feet. I run three forges, and I have a Rex engine of 3½ H. P. With it I run my forges, emery drill, band saw, and circular rip saw. I have a pair of Barcus shoeing stocks, and like them very much.

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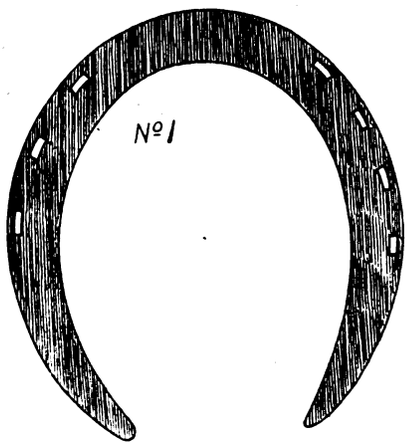
I ofttimes ask myself how a man can run a shop without power. A man can't run a shop successfully these days without power. I was born and bred in the good old state of Kentucky. Five years ago I came to this place, and I like the country fine. JAMES ROBERTS, Oklahoma.

A Few Oklahoma Prices.—I think your paper is a fine thing for the craftsman, and I look forward to its coming. I don't think I can do without it. I do not see anything in the paper from this section of the country, so I will give you an idea of the prices here.

4 shoes toed and calked	$1.50
4 shoes plain	1.25
4 shoes reset	.80
4 tires set wagon	2.00
4 tires set buggy	2.40
Front axle	3.50
Hind axle	3.00
Spokes	.20
Felloes	.25

As a side line we sell buggies, and we make a few dollars that way and don't miss the time. J. O. SMITH, Oklahoma.

Recutting Files and Tempering Springs.—I would say for the benefit of C. G. W. he can get his old rasps recut at the Co-Operative File Co., 257 Lowell St., Lawrence, Mass., and they do fine work. I also see Mr. P. Larson wants to know how to temper small springs. I do quite a little of that, and I will try and tell him how I do it. I heat the springs to a cherry red and drop them in clean soft water, then put the springs into a sheet iron basin, made like a bread tin with a handle. This tin is about 6 by 12 inches, and about 4 inches deep. Then put on a little sperm oil, enough to coat them all over. Now hold them over the fire, turning the basin up on one side to the other till the oil burns off. Do this twice, then turn the springs out on a board and allow to cool. You can temper forty or so better than one at a time. J. H. W., New Hampshire.



THE SHOE THAT WAS REMOVED

A Letter from Indiana.—I have a shop 18 by 36 feet. I use the back part for woodwork, which pays only when a man knows where to buy his stock and what kind to buy. I use the best stock I can get, and find it pays me to do so. I am the only smith in the town and am located in as good country as lies outdoors. Our population is something over 100, and all but three families in the town have their own gas for fuel and lights. We have one public well and two company wells with 300-pound pressure. We have gas enough to spare for a factory, and would gladly welcome one to our midst. My work consists of horseshoeing and general repair work. I shoe horses now for $1.00, while my neighbors do the same work for 80 and 90 cents. I get $7.00 for rims and tires. I use rims, bored, rounded, and ready to put on and find them quicker and little more expensive. A READER, Indiana.

Another on Welding Tires.—In your March number I notice an article from Mr. William H. Oblad on "How to Weld Tires." This is the way I weld them: Scarf in the ordinary way, cut corners a little, fuller down both ends to $\frac{3}{16}$ on point, fit together with a tap of the fuller, and hit under part of tire lightly with fuller or hammer to bind slightly. Then catch a heat edgewise. Thus both parts will heat the same, and no dirt nor slag will be in the way. I never fail to make a solid weld half or two-thirds across, no matter how wide or thick the tire. The second heat can be taken edgewise, or with the tire in upright position. I find in welding tires in perpendicular position that the inside scarf is hard to weld. This is due to dirt running down between the parts on the flat surface and unequal heat. Two heats are generally required to weld and finish up a heavy tire with sledge, so try my plan. W. H. GUNN, Virginia.

Which Shoe Is Best?—At 1 is shown a No. 0 Juniata shoe which was removed after being on the animal about sixty days. You could not tell he had on a shoe, for the wall had grown over it and was touching the ground, while the shoe was resting on the sole of the foot, with the heels between the wall and bar. At 2 is shown a No. 1, same make. This shoe was fitted full after the foot was dressed down. It extended a little beyond the foot from the back quarter to the heel, with a quarter of an inch on both sides of the frog and the shoe. Now, I want to know which is the best shoe for the horse. MAJOR B.

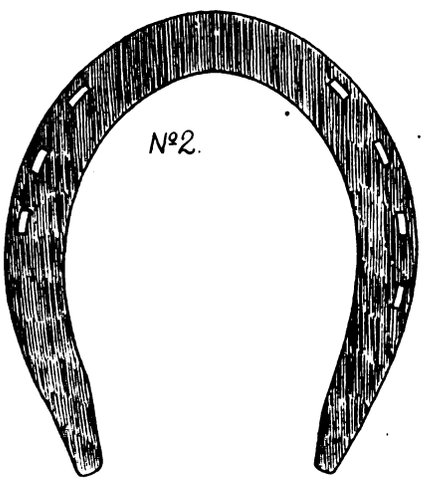
Rock Drill Tempering.—I would like to answer A. K. in regard to tempering rock drills. I have been dressing tools for 18 years in all the Western mining states and in the British Northwest, and will say it is very simple when understood. First, use a good grade of steel and use a cap head hammer. Use the draw side and not the face, as the face cuts the steel and carries temper checks. Work your steel at a high heat, fast and light, and as evenly as possible on both sides, and lay aside to cool naturally. When cool reheat from $\frac{3}{4}$ to one inch to a cherry red heat, put into water, and leave just enough temper to show a light straw and not make it necessary to cool the second time to stop the temper. If you do need to stop temper, just dip it; don't cool off dead. It is easy with a little practice. Sometimes I have 30 to 40 cooling at once, and sometimes it takes the temper fifteen minutes to run, but that is what makes a tough temper. I sharpen from 600 to 750 drills in 10 hours with one helper. GEORGE COX, Oregon.

Prices in Indian Territory.—I live in a small town, have my dwelling and my shop paid for, and I have been here three years. I have a good trade and will probably stay here for several years. I read THE AMERICAN BLACKSMITH and have learned a good many things from its pages. I do a good deal of horseshoeing, and when I shoe a horse for a man he generally brings him back for the second shoeing. I live on the prairie in a farming country, and do most all kinds of work. Will give you some prices of my work, as I have never seen a letter from this part of the country.

4 new shoes	$1.00
4 tires set	2.00
New wagon tongues	2.50
Wagon and buggy spokes, each	.20
Bellows	.25
New axle, front	2.75
" " hind	2.50

I will try and drop you another letter sometime. I love to read THE AMERICAN BLACKSMITH, and I learn a good deal from it. I have got some tools in the shop that I made from the patterns that I saw in my paper, and they do the work very well. S. C. TOMERLIN, Indian Territory.

A Letter from Arkansas.—In reply to Brothers Williams and Price in the April AMERICAN BLACKSMITH, will say I was truly glad to see their letter and want their address. I have just built a new shop 30 by 60, with a shoeing room 14 by 20. I also have a 5 H. P gasoline engine, a Jinks & Davis trip-hammer, a power forge, one hand forge, a rip saw, a drill press, and other tools, such as emery stand, grindstone, and hand tools. I expect to put in a band saw and wood lathe soon. I do nearly all kinds of repairing and have a large custom trade. I have no opposition that amounts to anything nearer than 12 miles.

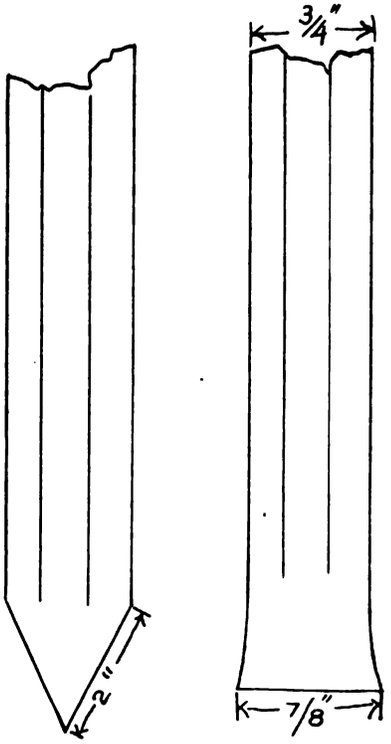


THE SHOE THAT WAS PUT ON

Brother craftsmen, don't cut prices. I set up in this town eight years ago and had only a bellows and anvil and a few tools to work with. There was one more shop here that was run by a cheap smith. I made it a point to do satisfactory work, always keeping my price above his. When a customer came to my shop and complained of high prices, I would tell him to go to the other shop, and that I did not come here to under-work the other man, and that he was here first. They would generally tell me that they would rather I would do the work. So, of course, I told them to pay me my price and then no one could kick. That is how I worked up a trade and at the same time worked the other man out. Don't cut prices, brothers, but do good work. If Brothers Williams and Price wish to write me, they will find my address with the editor. J. L. WILLIAMS, Arkansas.

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Pointing Cultivator Shovels.—As cultivating is on, and not seeing any remarks on pointing, I will give my way for doing it. I take a piece of good steel, ½ by 3 inches and mark it so it will make a three-cornered piece every time it is cut diagonally, then heat the side which is to be the up side, or top. Now take the hammer and peen a small place in the center, then turn this place over edge of anvil and pound it back. Thus you have a small



HOW TO TEMPER ROCK DRILLS

V. This I find much easier, quicker, and better than to cut out a V. The forks can generally be worked with the hammer to the desired length. When ready to weld, I put the point to place and clamp on side with the tongs, and place in a clean fire with plenty of borax, heating the one side opposite the tongs. When this is welded remove tongs and weld other side, then heat the whole point and send it home. I have put on 225 cultivator points this season, and have more to point. I claim a shovel that is pointed well is as good as a new shovel if not better. A few of our prices are as follows:

Pointing 4 broad shovels	$1.50
" 6 small "	1.75
" 2 plows	.65
Sharpening plows	$.15 to .20
Making lays, 16 inch	3.00
" " 14 "	2.75
" " 12 "	2.50
Setting tires	1.50
Putting in spokes	.15
" " felloes	.20

Our other work is in about the same proportion. W. R. GARMAN, Kansas.

How to Temper Rock Drills.— Brother A. K. in the June number wants to know about tempering rock drills. In reply I would say use the best quality octagonal English tool steel and shape the drills as shown in the engraving. Heat the steel to a good, bright red and draw out with the hammer. Never use a file to get a sharp edge, as that can be done with the hammer, and it will help to avoid cracks. To temper, heat the drill to a bright cherry red for about 2½ inches, then cool about 1½ inches of the end perfectly cold. Don't take out of water until it is cold, then draw the temper down to a nice straw color. I have used this plan for some time, and have never had a failure. C. E. ZEEK, California.

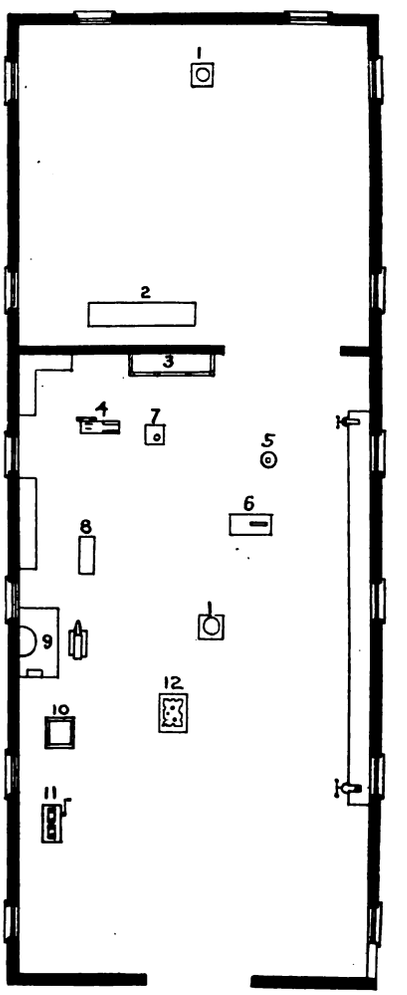
A Western Pennsylvania Smith Shop.—The accompanying engraving shows a plan of my shop. We do all kinds of general work, such as horseshoeing, vehicle work, repairing, painting, and general smithing. In the plan, 1 represents the stoves; 2, a bench-clamp; 3, iron-rack 4, gas engine; 5, wheel-jack; 6, bandsaw; 7, drill press; 8, emery stand; 9, forge; 10, tool rack; 11, tire-bender; 12, swage block stand. The second floor of the shop is used for storing lumber and other supplies. Our engine is a five horse power Fairbanks-Morse gas engine, and I believe in power. W. J. WINTERS, Penna.

A Word for Everyone.—Herewith find postal order for $1.00 to pay for another year's subscription to THE AMERICAN BLACKSMITH, and will say that I am only too glad to have the opportunity of reading your good journal for one whole year for the small sum of $1.00, and I am sure that the whole craft (I am not speaking of the botchers and price cutters) is truly thankful of the same opportunity. As far as I am concerned I could not give you the exact amount of benefit received, but will say this—that it is much in comparison with the cost. I am a young man, 31 years old, and I pray that you will continue to print your paper for a long time yet, as I would feel lost without it. It makes a good silent partner. There are other good journals which I take and read, but I value THE AMERICAN BLACKSMITH king of them all. Partly through the influence of my journal, I installed a gasoline engine and some machinery this spring, and I am well pleased.

I have a good shop 24 by 60 feet, two stories high, covered with imitation brick-steel siding, and I will be found every pleasant work day in the year, unless some good cause forces me away. I can make more money in the shop than I can going fishing, hunting, or to a ball game, and the more money I make, the better I can raise and educate my children, the happier I can make my home, and the better I can equip and handle my business. I never go into a saloon for any purpose, and I have discharged several men on that account, as liquor and business do not mix well and will not bring forth good results.

Now, a word to my brother smiths: Subscribe for a few good journals. Have plenty of good reading matter and a few good books on your line of the business. If you read and study them you will soon find that you are more respected by the better class of people, and your business will pick up, as you will be better prepared to handle it. Get yourself in the habit of staying at home as much as possible without interfering with your business. Make your wife and children love you. A kind word will do more than a dozen harsh ones. We were all put here for a good purpose, not for a bad one. Go with your wife and children to Bible school and church on the Lord's day. Do not forget to read your good Bible once in a while or a little oftener. Never talk ill of anybody, as you will do yourself more harm than you do them Especially your brother opponent—do not say a word to hurt his business. If you cannot say good of him, just keep your mouth shut and say nothing. If his work is not good, people will find it out without your telling them, and if his work is better than yours, they will know it, no matter what you say.

And another thing, if you do a credit business, do not let your accounts get too old. People who do not keep account of the work they have done sometimes forget, and possibly think that you have charged them more than you should. You, therefore, lose a good customer, although you were honest with him. Still another good point to the man who does a credit business is to get acquainted with every man in the county, whether he is your customer or not. Make it a point to find out whether he pays his grocery bills, hardware bills, doctor bills, etc. Do not wait until he asks you for credit, but be prepared to answer him at once, as otherwise you may



A WELL-EQUIPPED PENNSYLVANIA SHOP

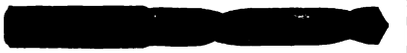
say "no" to a man who would make you a good customer, or say "yes" to a beat.

To "Our Editor" will say that you are doing a good work, and may you continue to do so until the end of your time, which I do pray is far off. May you continue to get new subscribers, and in the end may your reward be a home in heaven, where I hope I will meet all my brother craftsmen. A. C. HARRINGTON Indiana.

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These drills are made with ½ in. and ⅝ in. diam. round shanks and will fit all makes of Blacksmith's drill presses. The slab or flat portion of the shank allows the drill press set screw to hold the tool firmly, preventing slipping and injury.

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Prices Current — Blacksmith Supplies.

The following quotations are from dealers' stock, Buffalo, N. Y., Aug. 1, 1907, and are subject to change. No changes have taken place since last month's quotations.

All prices, except on the bolts, are per hundred pounds. On bars and flats prices are in bundle lots.

Bars—Common Iron and Soft Steel.

¼ in..	round or square;	Iron,	$2.95	Steel,	$2.95
⅝ in.,	"	"	2.55	"	2.40
½ in.,	"	"	2.35	"	2.20

Flats—Bar and Band.

¼	x 1 in.,	Iron	$2.40;	Steel	$2.40
¼	x 1½ in.,	"	2.30;	"	2.30
9-16	x 1½ in.,	"	2.50;	"	2.50

Norway and Swedish Iron.

¼ in., round or square	$4.90
⅝ in., " "	4.50
½ in., " "	4.30
¼ x 1 in	4.30
¼ x 1½ in	4.20

Horseshoe Iron.

For No. 1 shoe, ⅝ x ½ in	$2.50
For No. 2 shoe, ½ x ⅝ in	2.50
For No. 3 shoe, ⅝ x ¾ in	2.50
For No. 4 shoe, ⅝ x ⅞ in	2.50

Toe Calk Steel.

½ x ⅝ in. and larger	$3.00

Carriage Bolts. (Net Price per Hundred).

¼	x 2 in	$0.54	⅜x2½	in	$0.82
¼	x 2½in	.58	⅜x3½	in	.96
¼	x in	.62	⅜x6	in	1.81
5-16x	2 in	.65	½x4	in	1.70
5-16x	8 in	.75	½x6	in	2.10

Spring Steel.

⅝ to 1¼ in. Rounds.	Op. Hearth	$3.00,	Crucible $5.00
1¼ to 6 in. by No. 4 gauge to ½ in.	Flats	3.00,	5.00

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E. G. SMITH CO., Columbia, Pa.

FOR SALE—Blacksmith and machine shop, well equipped, good locality. Must sell at once. Address **C. W. HARRISON, Fountain, Okla.**

FOR SALE—Blacksmith shop, tools and stock. In good locality. Reason, poor health.
WM. SPERLING, Plymouth, Neb.

FOR SALE—Good second hand machinery. State your wants and get our prices,
Bicknell Mfg. & Supply Co., Janesville, Wis.

FOR SALE—Stock and tools with gasoline engine. Shop rented or sold. Only shop in town.
OLOF OLSON, Montgomery, Iowa.

WANTED—A good general blacksmith for mountain work. Must be a good shoer and a sober man. Good wages and steady work.
SAM BURNS, Box 716, Cripple Creek, Col.

FOR SALE—Blacksmith shop and tools, well equipped, doing good business in thriving town. Price reasonable. For description write
J. W. JONES, Coyville, Kansas.

FOR SALE—Complete set 4 to 25 H. P. gas engine drawings, patterns and patents. Patterns in Providence, R. I.
Hadwen Swain Mfg. Co., San Francisco, Cal.

WANTED—Salesmen for Extension Axle Nuts. Sure cure for wabbly buggy wheels. Exclusive territory. Big commission. Special introductory offer. **HARDWARE CO., Box Z 10, Pontiac, Mich.**

NEW TEMPERING PROCESS for rock drills, chisels and other tools. No water cracks or breaks. Made hard as diamonds. Full instructions for $1.
C. F. Eldenberg, 655 S. Helena St. Spokane, Wash.

WANTED—Traveling men who visit the carriage, implement and livery trade make big commissions, selling our steel and rubber-tired wheels, as a side line. Why don't you try it?
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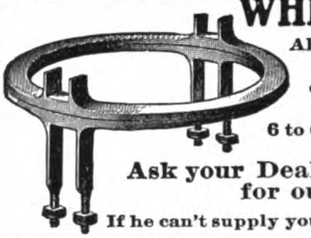
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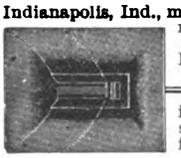
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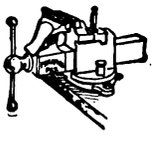
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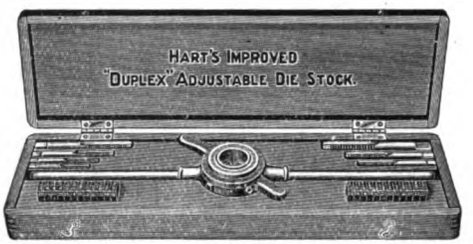
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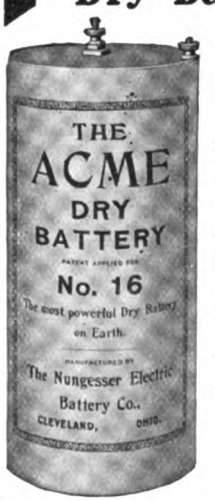
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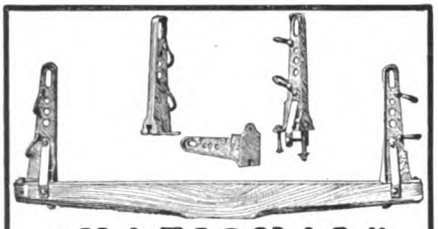
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Stronger than any other
Easy and quick to put on
Simply bore three holes and bolt on
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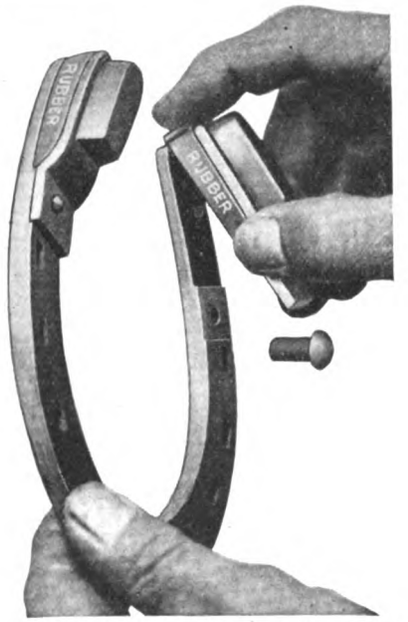


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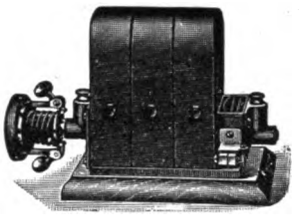
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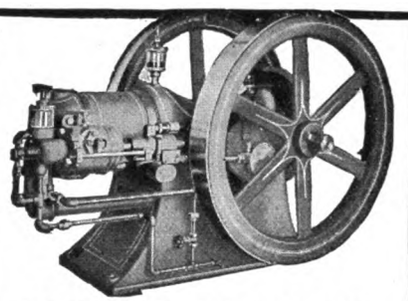
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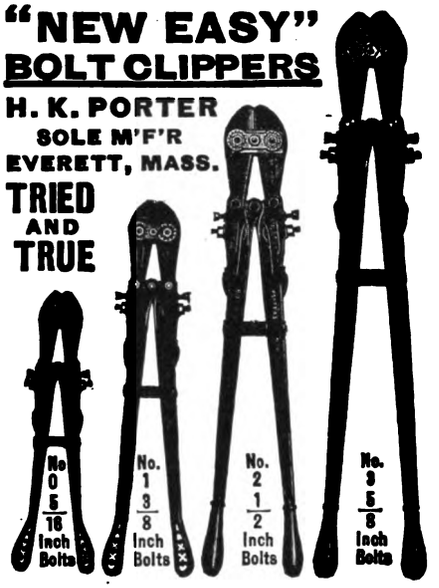
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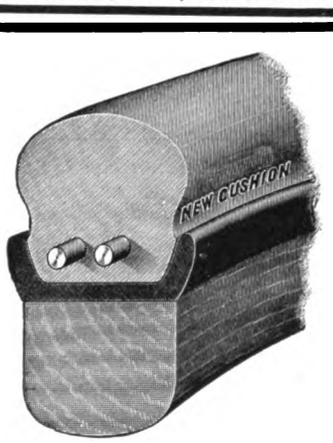
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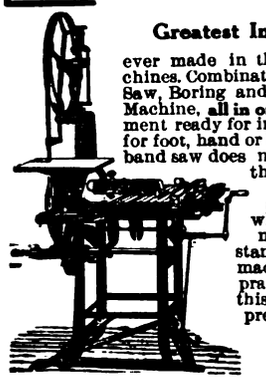
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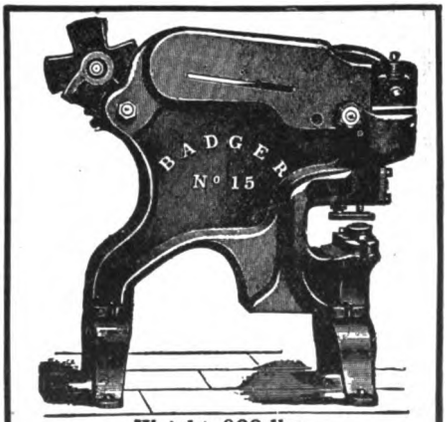
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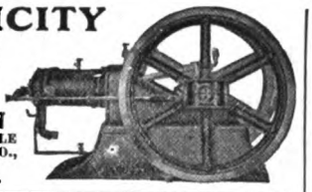
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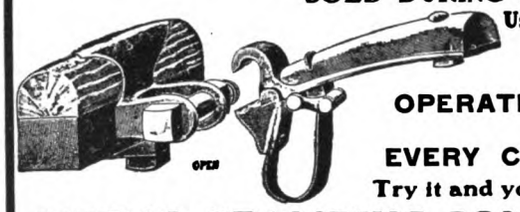
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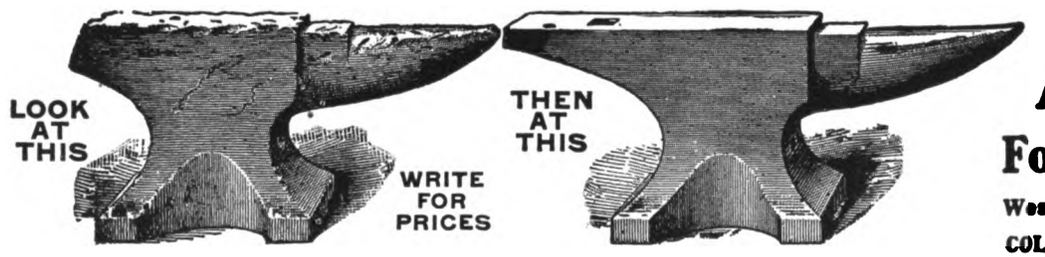


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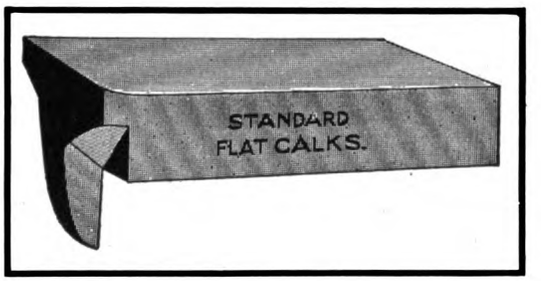
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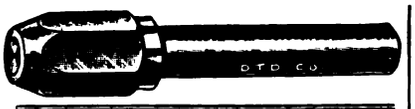
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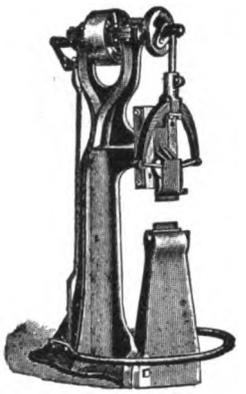


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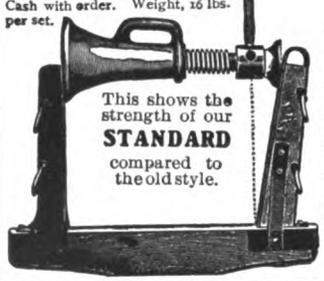
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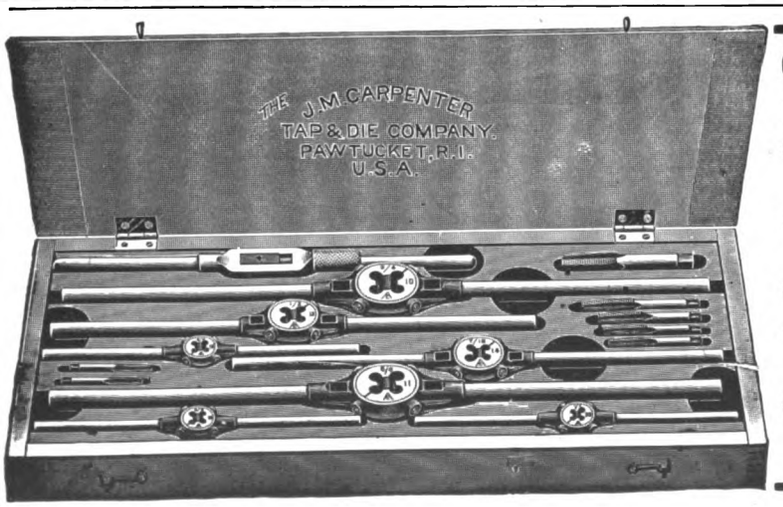
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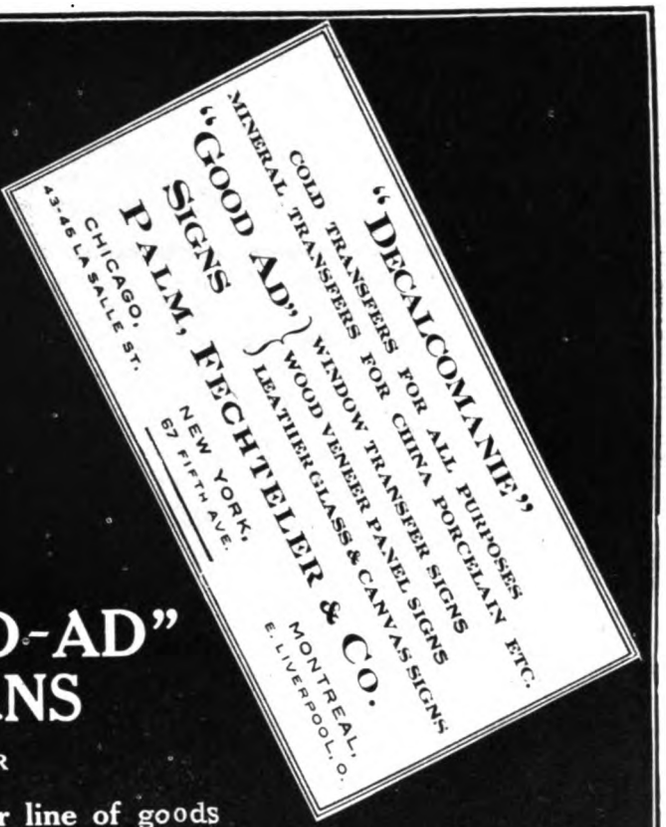
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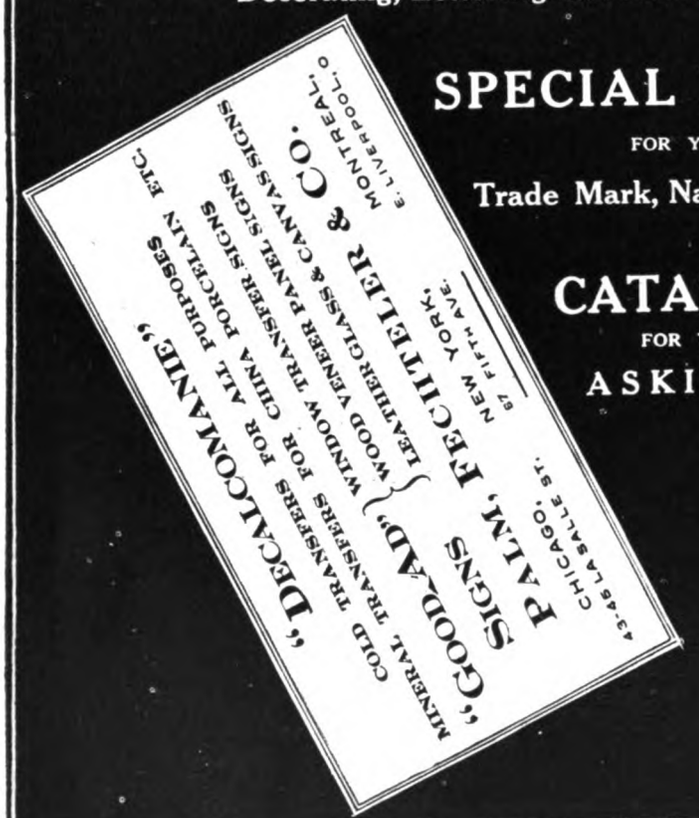
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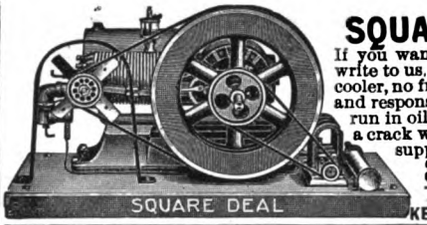




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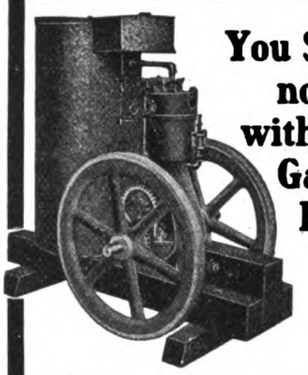
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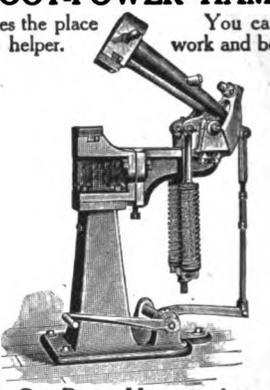
The **"Cray Bros."** Gasoline Engine has been proven by test to be **the most powerful and durable** on the market.

The mechanism is **simplified** as much as possible, and at the same time is made **strong and serviceable,** capable of performing **wonderful feats.**

The price? About **one-half** what others charge for engines of same horse-power.

Send for our FREE 1907 304 PAGE CATALOG.
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1247 W. Ninth St.
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BY USING A
STANDISH FOOT-POWER HAMMER.
Takes the place of a helper. You can do more work and better work.

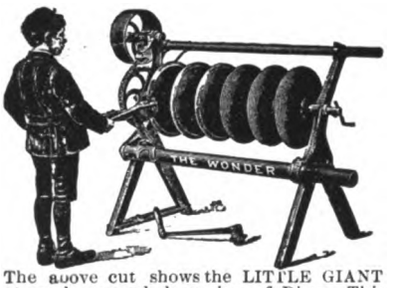


Our Power Hammers give perfect satisfaction wherever used and they are doing good work in the best shops in the country. Drop us a card and we will send you **interesting descriptive circulars free. Write at once—today.**
The Standish Machine & Supply Co.,
COLUMBUS, O.

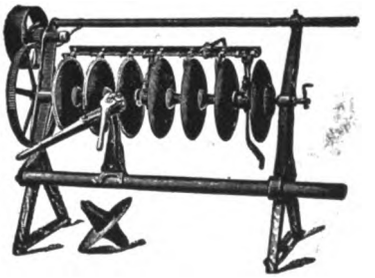
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A GOOD, RELIABLE, SUBSTANTIAL MACHINE IS

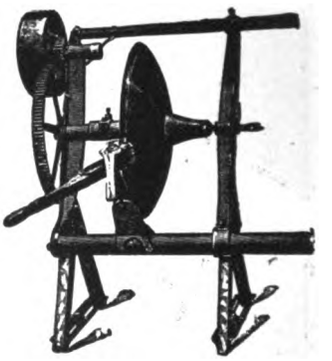
THE WONDER DISC SHARPENER



The above cut shows the LITTLE GIANT at work on a whole section of Discs. This machine is especially adapted for sharpening Disc Harrows.



The above cut shows the GIANT WONDER at work on a Seven Disc section.



The above cut shows the GIANT WONDER at work on Disc Plows. Will sharpen any size from twelve to thirty-two inches in diameter.

WITHIN the short time these disc sharpeners have been on the market, they have won ON MERIT a place in thousands of the best shops throughout the United States and Canada. They are in use in nearly every state in the Union, in Canada and in Mexico.

Sold by leading jobbers everywhere.

The only Sharpener made adjustable to all conditions. Can shear any part of edge to any bevel. Can shear back from edge as far as necessary. Can use tool on either side of disc. Can shift from one disc to another. Can do all this without the turn of a set screw or nut, is a positive feed, automatically adjusts itself to wobbling or bent discs. Knives made of best grade of self-tempering tool steel, will last a life-time. Ask your Jobber for them or write for illustrated descriptive circular--- SENT FREE ON REQUEST.

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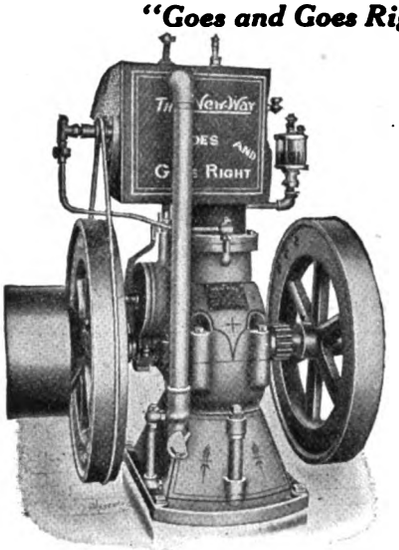
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need not be a complicated, bulky affair with a water tank that must be filled and emptied at least twice on every winter day.

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Cool all day.

Always ready to go summer and winter.

Excels in running machinery that requires full power all day.

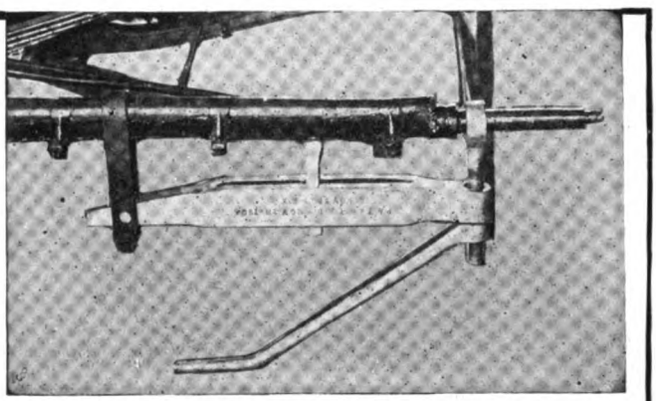
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Write us today for special proposition B 1 and catalog.

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A Labor and Time Saving Machine that does its work perfectly.

For setting or straightening Buggy Axles and all vehicles having a steel axle, Also Pitman rods of mowers, reapers and binders, bent rods and shafts in section harrows, cultivator beams, shaftings, etc.

The axle can be straightened in the vehicle **cold**, better than to take it out and heat it, and in one-tenth the time. Saves all the trouble of taking the axle out. No scarring of the wood or breaking of the paint.

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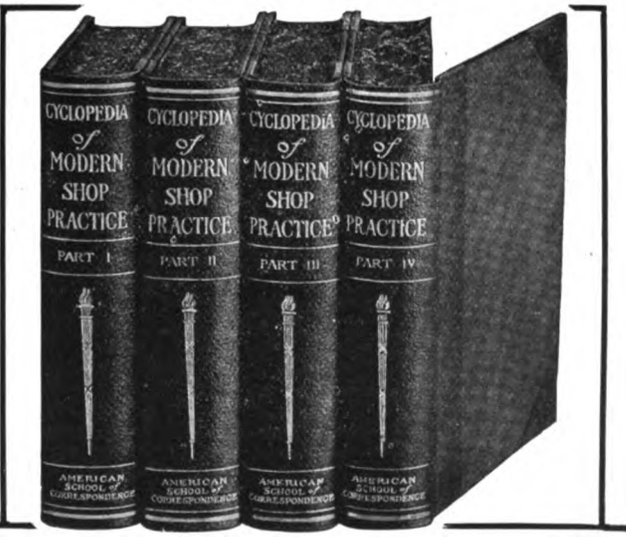
¶ Sent express prepaid if you mention The American Blacksmith, Aug., '07. If satisfactory, send $2.00 a month until the special price is paid; otherwise notify us to send for the books at our expense. ¶ If you are a machinist, tool maker, blacksmith, foundryman, pattern maker, sheet metal worker, draftsman, steam or gas engine engineer, electrician, etc., this is your chance to GET AHEAD.

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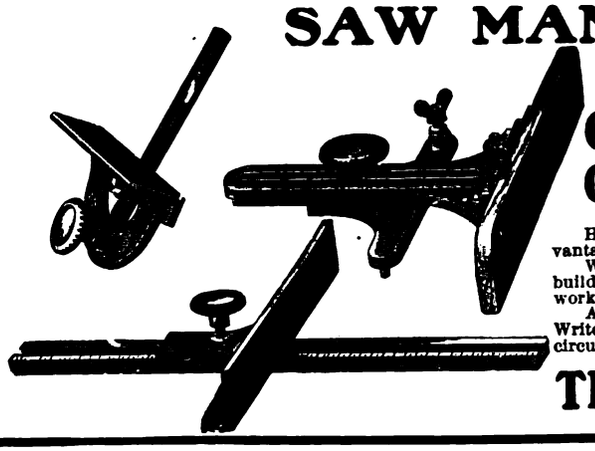
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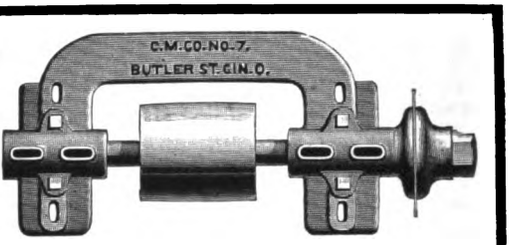
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RIP and CROSS-CUT GAUGES





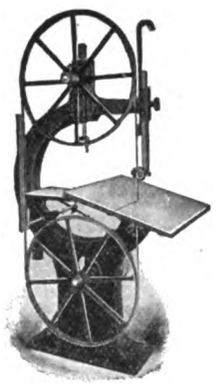
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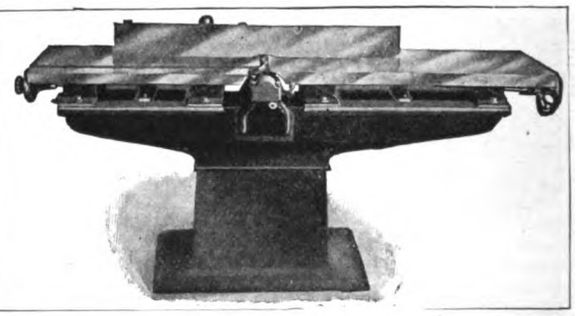
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RIP SAWS
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CORTLAND, N. Y.

Manufacturers of

Climax Welding Compound,
Cherry Heat Welding Compound,
and BORAX--ETTE.

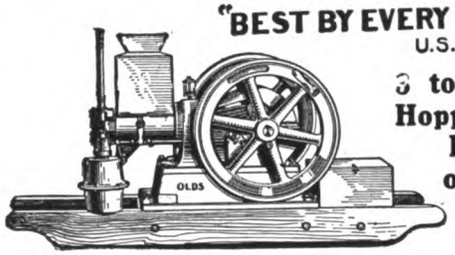
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BORAX-ETTE FOR STEEL TRADE MARK. A PERFECT WELDING FLUX. PREPARED ESPECIALLY FOR WELDING FAR SUPERIOR TO COMMON BORAX.

SAMPLES FREE.

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"BEST BY EVERY TEST."
U.S.GOV'T REPORT.



3 to 8 H. P. Hopper Jacket Engine on Skids.

This engine is ready to run when you get it. fill it with gasoline, throw on the switch, turn the wheel—that's all.

No pipe to connect, nothing to set up, no foundation to make, no experience required.

It is the most practical engine for the blacksmith, because it is always ready, compact, adjusted and can be moved anywhere.

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Write us to tell you about our liberal proposition that WILL SAVE YOU MONEY.

We guarantee every Olds Engine to run properly. You take no risk in buying it. There is an agent near by to see that everything is all right.

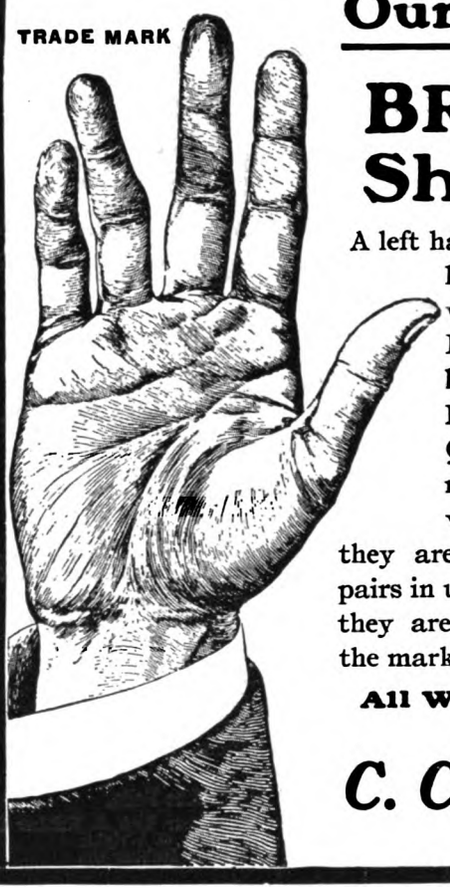
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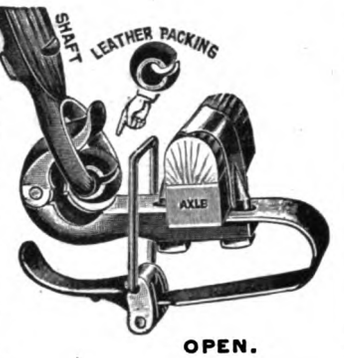
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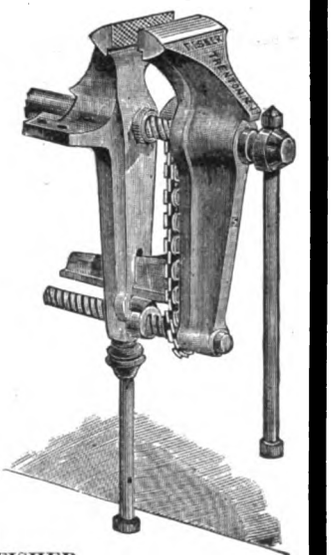
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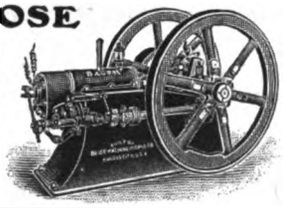
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To Find Address of any Firm given here, consult their advertisement. For its location in this issue, see Index on Page 21.

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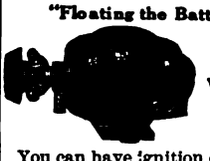
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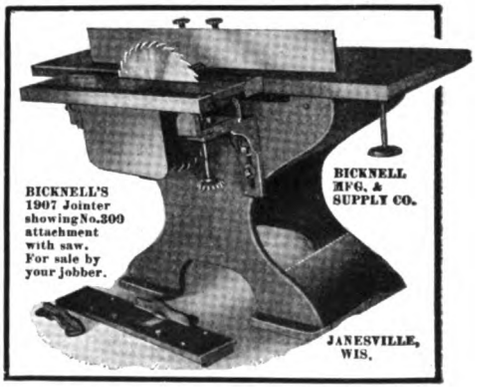
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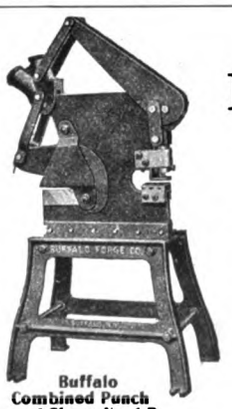

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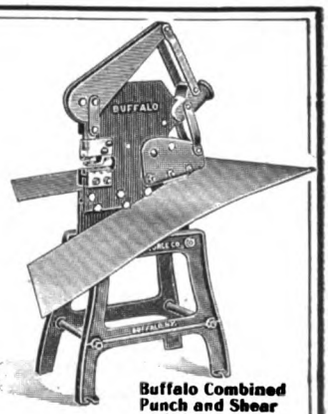
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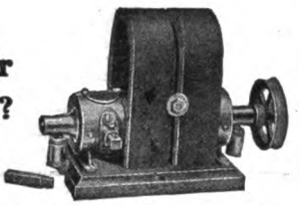
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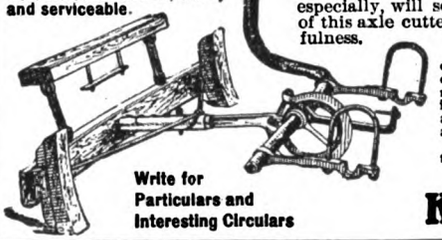


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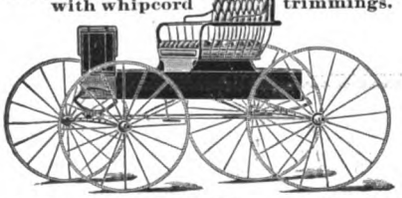


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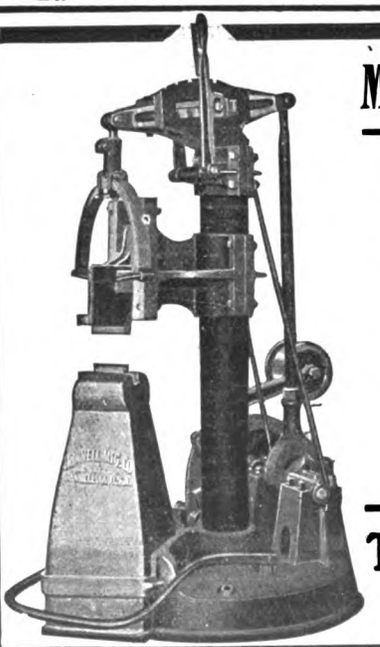
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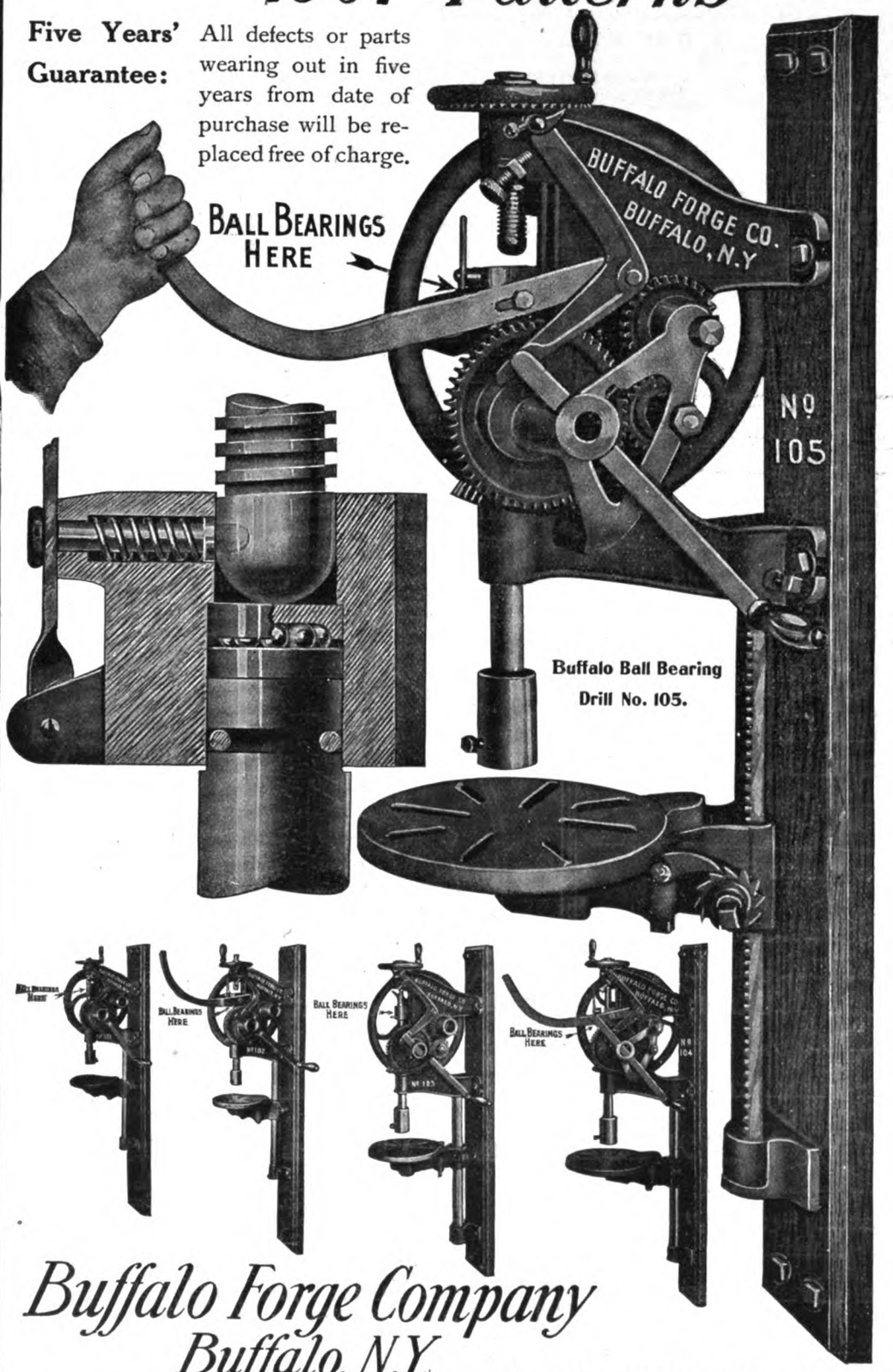


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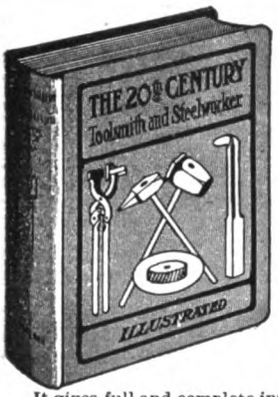
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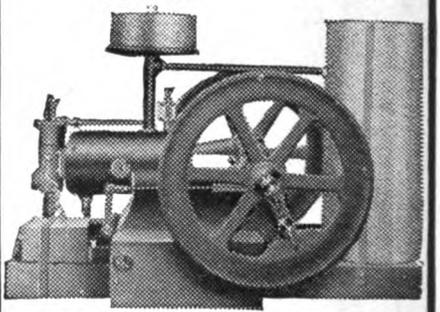
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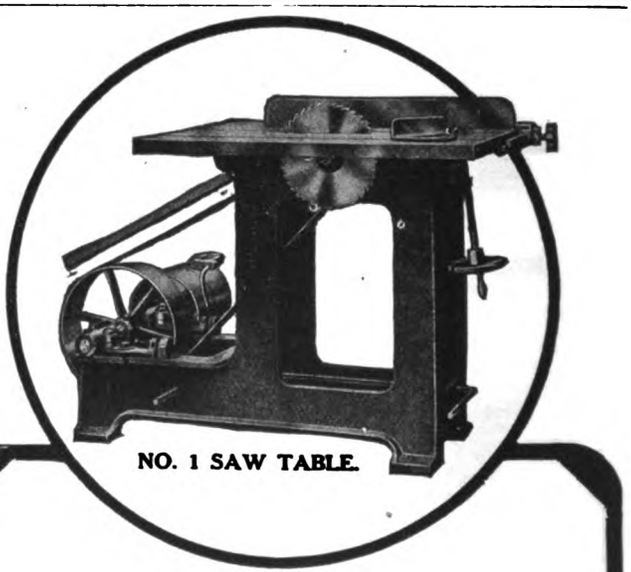
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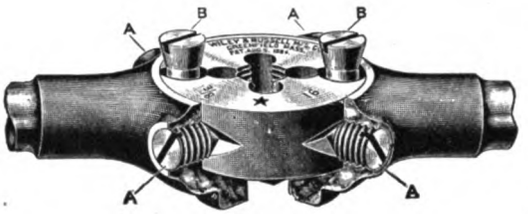
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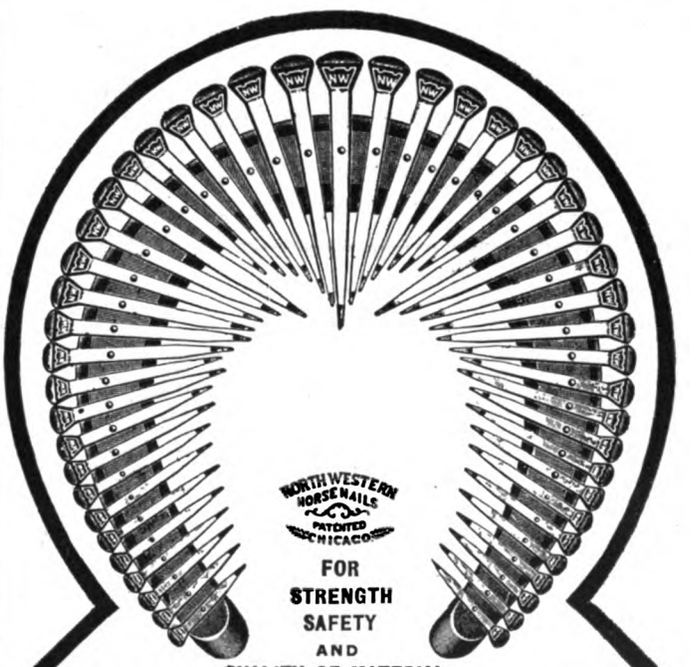
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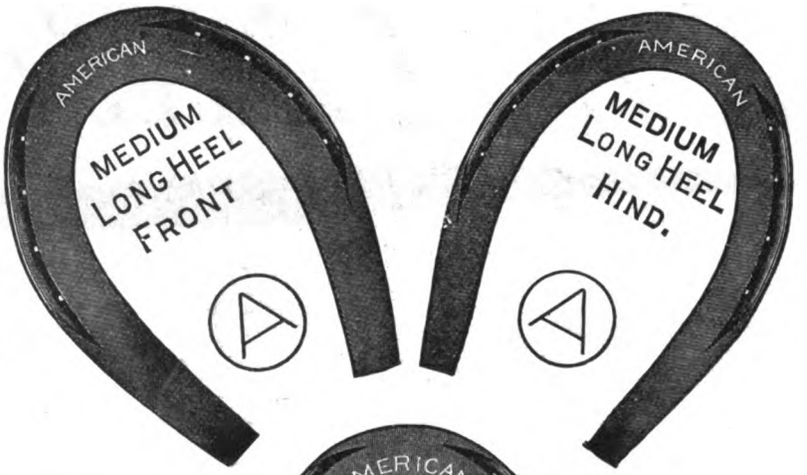
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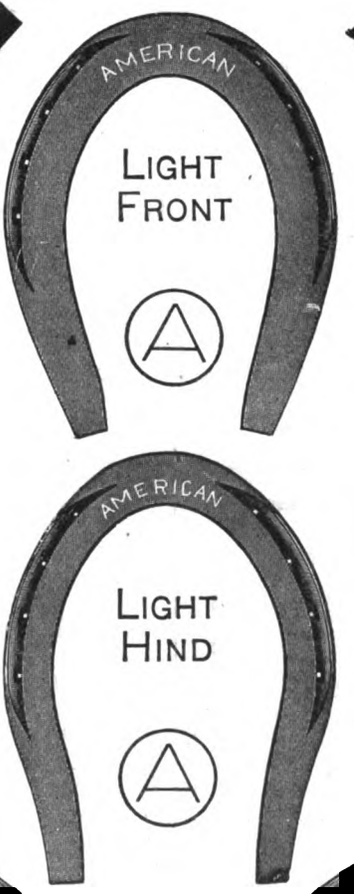
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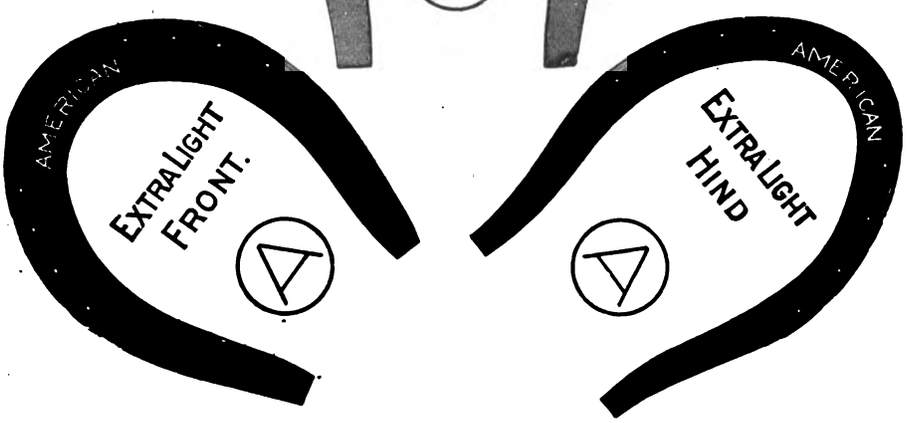
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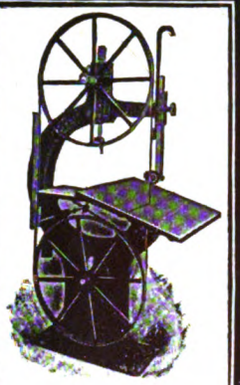
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YOU WILL NEVER FAIL
To Make a Strong, Clean Weld If You Use Perfection Welding Compound.

We invite you to give our Compound a thorough test, and will ship any amount to any address for that purpose. If it does not prove just as represented we pay all expenses.



Perfection Welding Compound will do the trick quickly and neatly. It makes a stronger weld than any other compound manufactured, as proven by the tests it has undergone. Send for free sample.

PRICE CONSISTENT WITH QUALITY.
PERFECTION WELDING COMPOUND CO., SCRANTON, PA.

Zanesville, Ohio, May 23, '07.

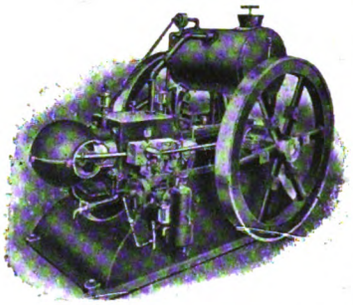
Buffalo Forge Co.,
Buffalo, N. Y.

Gentlemen:

In the last twenty-six years I have used several different kinds of Blowers, but for the last fourteen I have used only the —— Blower I find that the Buffalo Blower No. 200, which I have used for the last thirty days, runs easier and blows a better blast than any other kind I have ever used, and I would have had one of your Blowers before now if I had known of its excellence.

Yours truly,
FULTON Y. ROBERTS.

LIGHTNING GASOLINE ENGINES

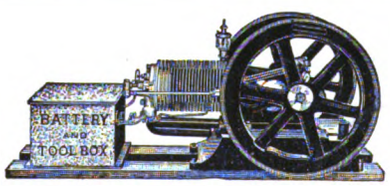


Steam Cooled
Double Piston
No Foundation

Send for Catalogue Showing Superior Points, and get Prices

KANSAS CITY HAY PRESS CO. 482 Mill St., Kansas City, Mo.

MONARCH



MONARCH

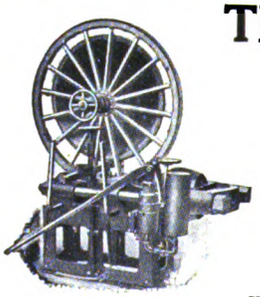
Why not take the agency for the little 2 H. P. "MONARCH" air-cooled pumping engine? Why not place one in your shop and hitch it to some of your machinery, show it to your customers, and increase your profit 25 to 50 per cent. through making sales to farmers and for small shop work?

They are an exceptionally good paying proposition. They are guaranteed in every respect. They work perfectly, simply, economically and, without a doubt, are a money-maker and a money-saver to both dealer and customer.

Our prices are right. Our dealings are right. Our goods are right—so it's up to you.

Give us a trial, or write us for descriptive circular and prices.

MONARCH MACHINE COMPANY,
307 E. 1st St. DES MOINES, IOWA.



THE SCIENTIFIC HYDRAULIC TIRE SETTER

IS WHAT YOU WANT.

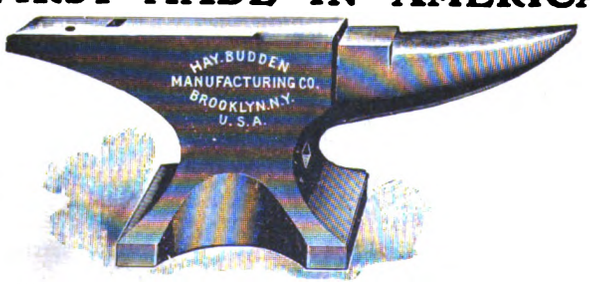
WRITE TO

STANDARD TIRE SETTER CO.,
KEOKUK, IOWA.

HAY-BUDDEN SOLID WROUGHT ANVILS
FIRST MADE IN AMERICA

The Gold Medal Anvil
HIGHEST AWARD
OMAHA, 1898 PAN-AMERICAN, 1901

Every Genuine "Hay-Budden" Anvil is made of the best **American Wrought Iron** and faced with the best **Crucible Cast Steel.** Every genuine "Hay-Budden" Anvil is made by the latest improved methods.



Over 100,000 in Use
WARRANTED
WEIGHTS FROM 10 to 800 LBS.

Experience has proved their worth and demonstrated that "**HAY-BUDDEN**" **Anvils** are Superior in Quality, Form and Finish to any others on the Market.

HAY-BUDDEN MFG. CO., BROOKLYN, N. Y.

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UNIV. OF
SEP 6 1907

VOLUME 6 NUMBER 12

THE AMERICAN BLACKSMITH

A Practical Journal of Blacksmithing and Wagonmaking

BUFFALO N.Y. U.S.A. SEPTEMBER, 1907 $1.00 A YEAR 10c A COPY

Announcement!

Two Great Calk Concerns Combined

The famous **H Calk** and **Rowe Patent Calk** have merged their selling interests into one corporation.
Two of the best Calks on the market now under one roof.
Extensive Advertising Campaign now under way and horseshoers all over the country will ask for H and Rowe Calks. Have your stock complete. They do not conflict in any way. The Rowe Calk is a **steel-center** calk for general use, and the H Calk is an all-steel calk for hard pavements.



The Rowe Calks

(steel center)

Here are some of the **exclusive features** of the famous ROWE CALKS:

ROWE CALKS have solid steel centers running from end to end.

These centers form integral parts of the calks. They **cannot** slip out. Rowe calks **wear longer** than calks that have inserted steel wire centers.

Rowe Calks are **self-sharpening.** We have solved the problem by perfecting a process of hardening the steel centers and have avoided the danger of introducing carbon and impurities into the soft exterior.

We use the highest priced stock known to calk manufacture. Our process insures absolute uniformity in the threads. Rowe Calks have **standard** taper thread and will fit any standard calk tap.

Rowe Calks have round or square shoulders. They cannot cut into shoe and work loose.

For satisfactory service under all conditions the **Rowe Calks** are unsurpassed.



The H Calks

(all steel)

H Calks are made of steel that **wears smooth,** leaving **sharp edges** on the letter H. They are **always sharp.**

H calks are especially adapted for use on **smooth, hard, unyielding pavements,** on **cobble stones** or **icy streets.**

H Calks are made from an extra fine quality of steel, of extraordinary hardness.

The six cutting edges of H Calk prevent the calk from moving in any direction. They have wonderful **gripping** power. So great is this power that on smooth pavements it **doubles** the pulling capacity of the horse.

Even if the weight of the horse is not sufficient to cause the calk to make an impression in the pavement, the sharp edges prevent the calk from slipping.

H Calks have standard taper threads. They are interchangeable with all standard brands and all standard taps can be used in fitting shoes for them.

Our Booklet "Calk Talk" Free on Request

This valuable booklet tells all about H and Rowe Calks—how they are made—how they are sold—everything you want to know about calks. Write today for a FREE BOOK and get posted on the calk question.
IMPORTANT: Some concerns sell to dealers and mail order-houses who sell direct to consumers.
The horseshoer loses this profit.
This new Corporation—The H and Rowe Company—sell only to horseshoers, or to concerns who sell exclusively to horseshoers.
Confine your purchases to the concerns who sell only horseshoers.

THE H & ROWE CALK COMPANY

Exclusive Selling Agents

109 - 111 Broad Street **New York**

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How About YOU?

IS "working for your health" so pleasant that you don't care whether your shop pays a profit or not?

Are you still using the old antiquated methods in preference to the newest labor-saving tools?

Would you really object to a few extra dollars floating your way every week in the shape of increased profits? Could you use that extra money for anything?

Now we frankly admit that we don't know it all—we only know how to make the best tools.

When you're thinking how to increase your profits, when you're worrying over how to cut down expenses, when you're fretting about your wasted time and material—just pick up a post card and ask us for our new 1907 Machinery Catalog?

That 's what we printed them for.

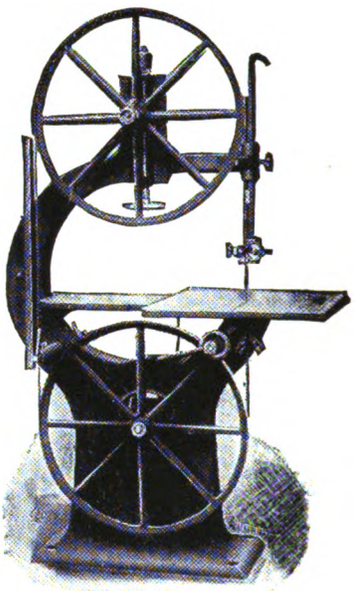
Silver Manfg. Co.

365 Broadway,

Salem, Ohio, U. S. A.

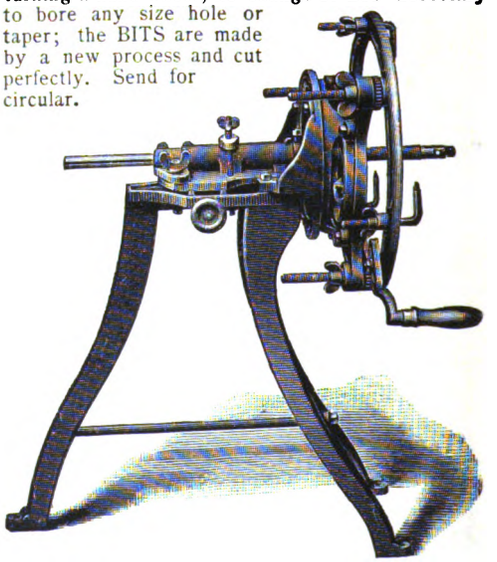
Improved Band Saws

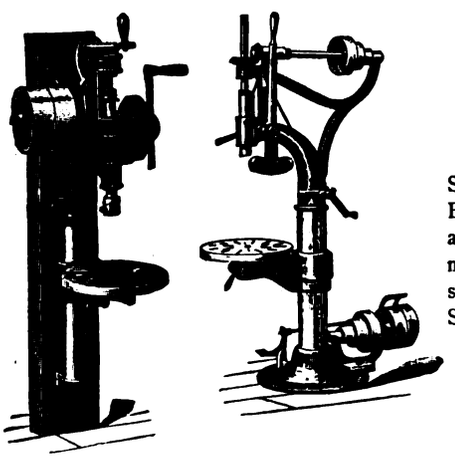
Foot and belt power. New patterns throughout—rigid, symmetrical construction, new table tilting device, perfectly balanced wheels. Belt shifter, adjustment of upper wheel, saw guide, tension of saw blade, etc., all within easy reach of the operator. Sizes, 20 to 36 inches.



Taylor's New Taper Hub-Boring Machine.

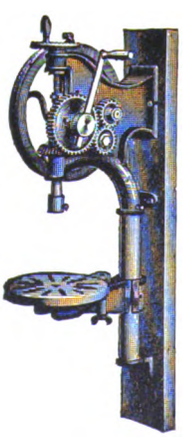
Special Features—Cut of BIT regulated simply by turning a hand wheel; no change of BIT necessary to bore any size hole or taper; the BITS are made by a new process and cut perfectly. Send for circular.





Drills

Swing, Post and Bench Drills for hand and power. Automatic feeding, new simple and efficient. Strong and durable.



Portable Forges

We make 14 kinds of Portable Forges. We have a size to suit your needs. Strong and durable. Attractive designs.

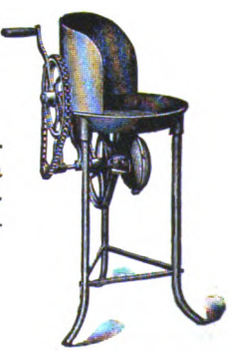


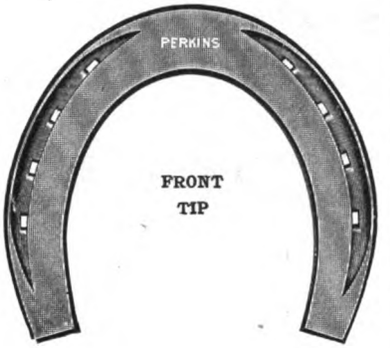
Fig. 901, with Shield.

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HIND
LONG HEEL.

Look for this Trade Mark ★ The Star brand beats all others



FRONT
TIP



FRONT
LIGHT.



FRONT
TOE WEIGHT.

★PERKINS★
HORSE SHOES
AND
TOE CALKS
The **SUPERIOR** Kind

Have more points of superiority than any other make. An up-to-date shoe for up-to-date Blacksmiths.



HIND
SIDE WEIGHT.

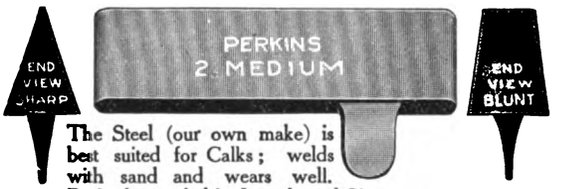
Perkins Shoes have given satisfaction wherever used. Our line is complete and every shoe guaranteed. Made in all styles and sizes. Send for sample. New Pattern Front Extra Light and Light. Free for the asking. We will gladly send

COMPLETE CATALOGUE AND SAMPLES FREE.

WRITE TODAY.

PERKINS

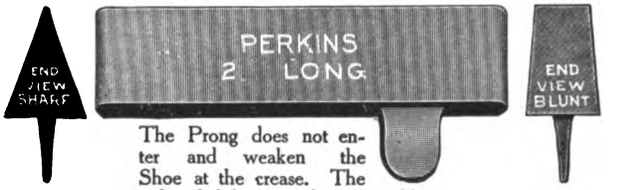
Made in Medium and Long, both blunt and sharp. Packed in 25 lb. boxes.



The Steel (our own make) is best suited for Calks; welds with sand and wears well. Perfectly graded in Length and Size.

TOE CALKS

Chisel Pointed Prong. These cuts show exact size of No. 2. SAMPLES SENT FREE.



The Prong does not enter and weaken the Shoe at the crease. The only slightly curved Calk sold.

MANUFACTURED BY

RHODE ISLAND PERKINS HORSE SHOE COMPANY

PROVIDENCE, RHODE ISLAND.

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BOSS LEATHER APRONS

Have you tried them?
They outwear six of the ordinary kind.
Send us your name and address and receive a miniature

APRON FREE





Our Aprons are made of Cow Hide, purely bark tanned, soft, pliable, strong and durable. You will appreciate their superior quality and extreme comfort

ASK YOUR JOBBER FOR THE BOSS LEATHER APRON

If he cannot supply you, send your order direct to us. Upon receipt of price we will ship a perfect "Boss" Apron to you, charges prepaid, or will send same by Express, C. O. D., giving you privilege of examining it at the Express office. If it does not suit you, send it back at our expense

The "Boss" Aprons come complete either with or without bib. They have brass eyelets and leather straps, and every possible convenience

Write to us today and we will send you a miniature Apron, showing the material used and how they are made

EDMUND C. BECKMAN

SOLE MANUFACTURER

712 N. Fourth St. ST. LOUIS, MO.

"THE BOSS"
Size X, 30x36 in., $1.75
" A, 26x33 in., 1.50
" B, 24x30 in., 1.25
" C, 24x27 in., 1.00

"THE BOSS" with Bib
Size D, 30x42 in., $2.00
" E, 28x38 in., 1.75
" F, 26x34 in., 1.50

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First Under The Wire

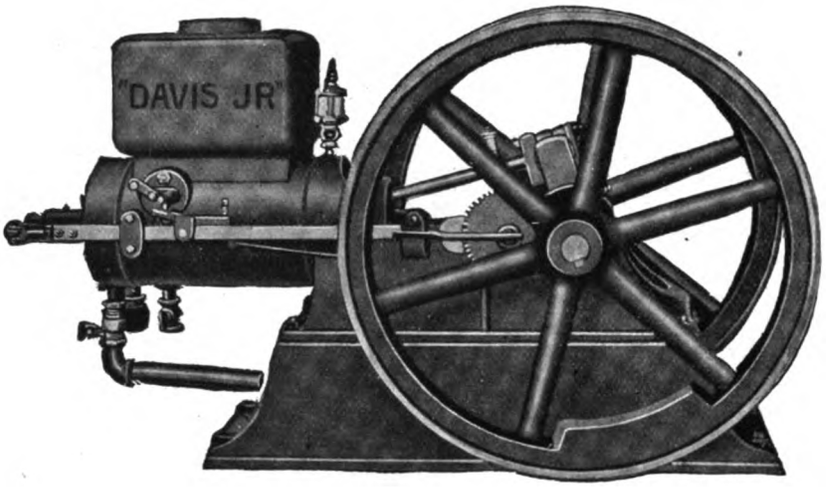
FIRST UNDER THE WIRE with the Humane Cushion Heel Shoe, which combines all good features in one. It is a shoe which appeals to all horse owners.

We do not believe that there is a line of Horse Shoes in this country that has made so rapid a gain or secured more general approval from the Trade than our Humane Cushion Heel Shoe. We want you to know that MERIT has done it and we want YOU to give them a TRIAL. You run no risk, as every pair is guaranteed to be practical and as durable as the common shoe. They will do more for the horse than any shoe that has ever been introduced; therefore, let us have your trial order.

The Humane Horse Shoe Co.
LIMA, O.

ON THE DAVIS

Gasoline Engine Our Proposition is Positively the Best Ever Made by Any Factory



5 Actual Horse Power Stationary Engine $89 **2 Horse Power, Frost Proof Stationary Engine $59**

The **DAVIS** has been recognized as a standard high-grade Engine for 15 years. Over **2,500** now used in Iowa **alone.** We have thousands of well satisfied customers in **every** state and territory. **You** are losing money if you do not own a **Davis** Engine.

The **Davis** Engine is not over-speeded. Remember the bore and stroke counts, and 25 per cent increase in speed on same dimensions and quality is 25 per cent **advance** in price. If not convenient to pay all cash we will take your note at legal rate of interest for part of the purchase price on larger sizes. Prices include electric igniter and fittings ready to run. Warranted for two years against defective workmanship and material.

Deal direct with the Big One-Price Factory. It is ABSOLUTELY SAFE.

Satisfaction Guaranteed. Write today for our 30-day free trial offer.

Cascaden Manufacturing Co., Waterloo, Ia., Grand Forks, N. D.

Send for Our Free Catalogue of Stationary and Portable Gasoline Engines from 2 to 28 H. P.

Morse Twist Drill & Machine Co.

NEW BEDFORD, MASS., U. S. A.



Tools for Blacksmiths' Use.

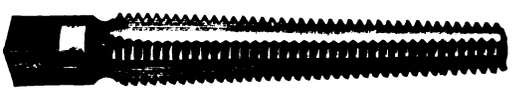
Twist Drills, Reamers, Taps, Chucks, Cutters, Dies, Machinists' Tools, Machinery.

SEND FOR CATALOG.

"MORSE"

the name that guarantees "quality," "accuracy" and "economy."

BLACKSMITH TAPER TAPS.





When Ordering ANYTHING in the line of

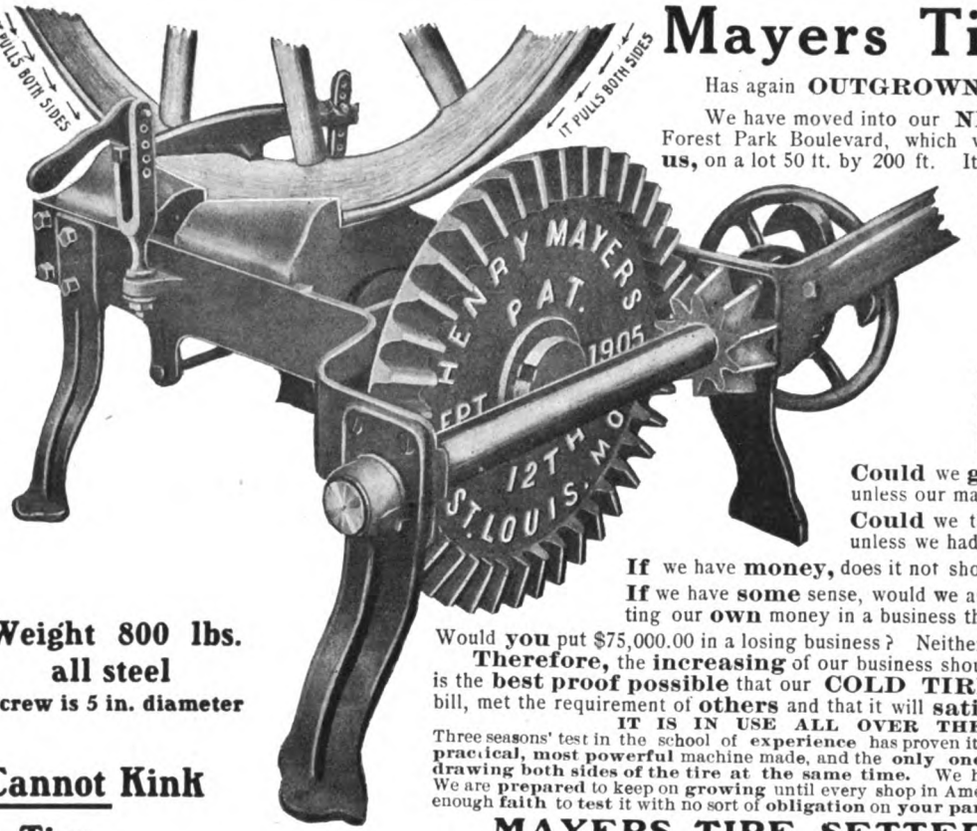
STEEL SHAPES

for repairing plows, cultivators and other instruments, be sure to ask for "STAR" goods and get the best. ——— All qualities and sizes, and everything guaranteed.

Star Manufacturing Co.

CARPENTERSVILLE, ILL.

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Mayers Tire Setter

Has again **OUTGROWN** its **QUARTERS.**

We have moved into our **NEW FACTORY**, 4028-30 Forest Park Boulevard, which was **built especially for us,** on a lot 50 ft. by 200 ft. It is equipped with the latest improved machinery and is the best lighted and most up-to-date Factory of its size in the city of St. Louis.

WE INCREASE OUR CAPACITY 4 TIMES

What does **this** mean to **you?** It **should** mean **lots** and **lots.**

Does it not show **growth?**

Could we **grow** and keep on **growing** unless our machine was a **success?**

Could we thus **enlarge** and **expand** unless we had **money?**

If we have **money,** does it not show we have some **sense?**

If we have **some** sense, would we as **sensible** men keep on putting our **own** money in a business that was not a success?

Would **you** put $75,000.00 in a losing business? Neither would **we** do it.

Therefore, the **increasing** of our business should **prove** to **you** that **this** is the **best proof possible** that our **COLD TIRE SETTER** has filled the bill, met the requirement of **others** and that it will **satisfy you.**

IT IS IN USE ALL OVER THE WORLD

Three seasons' test in the school of **experience** has proven it to be the **most simple, most practical, most powerful** machine made, and the **only one** with the **correct principle** of **drawing both sides of the tire at the same time.** We have **FAITH** in **OUR** machine. We are **prepared** to keep on **growing** until every shop in America has it. Can **YOU** not show enough **faith** to **test** it with no sort of **obligation** on **your part?** Let's talk about it, anyway.

Weight 800 lbs. all steel
Screw is 5 in. diameter

Cannot Kink a Tire

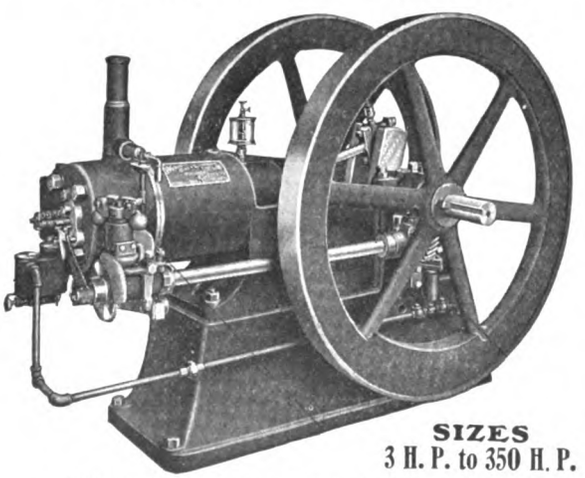
MAYERS TIRE SETTER MFG. CO.
4028-30 Forest Park Boulevard St. Louis, Mo.

WEBER GAS GASOLINE ALCOHOL ENGINES

THE POWER FOR YOUR SHOP

INCREASE YOUR OUTPUT!
DOUBLE YOUR PROFIT!

ENID, Oklahoma,
Weber Gas Engine Co,
Gentlemen;—
I am using a 6 H. P. Weber Engine and will say it is all you claim it to be. It works fine and gives steady power. I would not want an engine to start easier, and it is also economical in the use of gasoline. The fact is, I would not be without it as my power is always ready. Every up-to-date Blacksmith and Wagon Maker should have one of these engines. It is astonishing how simple they are and how easy to run.
Yours truly
WM. HACKETT.



SHAWNEE, Ks.
Weber Gas Engine Co.
Gentlemen:
I will say that in my experience I have found the Weber to be the best engine made. The reason why I bought the "Weber" is because it is the simplest one to keep in order.
My engine runs Grindstone, Emery Wheel, Turning Lathe, Rip Saw, Cut-Off Saw and Drill Press.
I purchased my engine about the 23rd of May, 1904, and it is as good as new today. I use it every day and I will buy another Weber when this one is worn out.
Yours truly,
J. C. KEENAN.

HIGHEST AWARD
ESTABLISHED 1884 PRODUCER
WEBER
GAS GASOLINE ENGINES AND HOISTS
GOLD MEDAL

SIZES
3 H. P. to 350 H. P.

Write for descriptive catalog, stating the H. P. you want.

Weber Gas Engine Co., P. O. Box 400. Kansas City, Mo.

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Who's Getting The Pad Profits in Your Town ?

ARE YOU ?

ANY shoer who is willing to talk with his customers about the value of pads (and there are plenty of good things to be said about them), and who will make it a practice to use only the kind of pads that will **BACK UP** his pad-arguments, can soon work up a hustling pad business—and a hustling pad business is a splendid thing for a shoer's bank account.

MORGAN & WRIGHT PADS

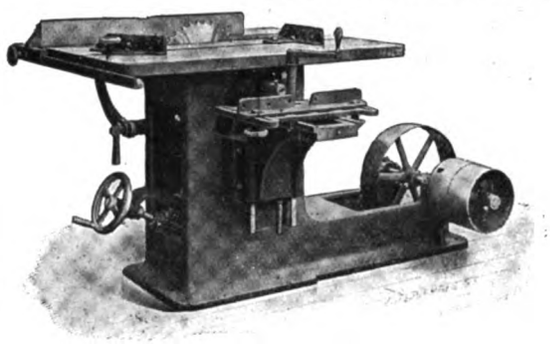
are used **EXCLUSIVELY** by many shoers who are making a specialty of the pad end of their business, and these shoers are getting the **PAD PROFITS** in their town. ¶ It's a matter of **GOOD** pads and **PUSH.**

Get a sample order of our pads from your dealer and "get into the pad game."

Morgan & Wright
DETROIT

New York, 216 W. 47th St. Chicago, 81 Michigan Ave.
Boston, Motor Mart. Atlanta. 92 N. Prior St.
Dayton, 405-411 E. Third St. St. Louis, 538 Vandeventer Ave.
San Francisco, 423-433 Golden Gate Ave.

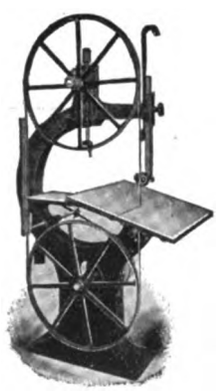
The Cordesman Utility Saw Bench



IF you were confident you could purchase a high grade saw bench which would do absolutely perfect ripping, cross-cutting, mitering, grooving, boring, etc., which would require but little room and power—at a moderate cost, would you hesitate about buying one? Our No. 2 Dimension Saw meets these requirements. It saves its cost and your temper in a comparatively short time. Write for large circular and particulars.

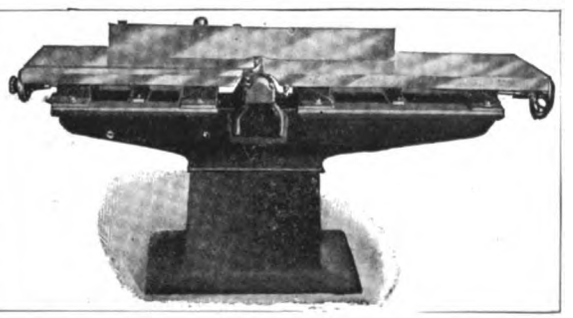
The Cordesman-Rechtin Co.
Dept. D. Cincinnati, Ohio

"DEFIANCE" Wood-Working Machinery



BAND SAWS
CUT-OFF SAWS
SWING SAWS
RIP SAWS
JOINTERS
LATHES

Write for Prices and Other Particulars



The Sidney Tool Company, Sidney, Ohio

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SOLD UNDER THIS TRADE MARK

The Best Horseshoe Nails in the World and driven by the vast majority of first-class horseshoers in the United States

"CAPEWELL" HORSESHOE NAILS



Nails Sold Under this Trade Mark surpass all others in Driving Qualities and always give the Best Satisfaction

MADE BY

THE CAPEWELL HORSE NAIL CO.
HARTFORD, CONN.

BRANCHES

New York: . . 103 Beekman St.
Philadelphia: . . . 323 Arch St.
Baltimore: . . 6 East German St.
Buffalo: . . . . . 11 Ellicott St.
Cincinnati: . . . . 720 Main St.
Detroit: . . . 69 Jefferson Ave.
Mexico City: . . Apartado, 2377
Chicago: . . 238-240 Randolph St.
St. Louis: . . . 12-14 North 12th St.
New Orleans: . . . 736 Union St.
Denver: . . . . . 1611 Blake St.
San Francisco: Santa Fe Warehouse, Spear St.
Portland: . 554 Worcester Block.
Toronto, Canada: . 50-56 Duke St.

The Largest Manufacturers of Horse Shoe Nails in the World.

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COLD FILE FINISH

PREPARED EXCLUSIVELY FOR HORSE SHOERS

TRADE MARK

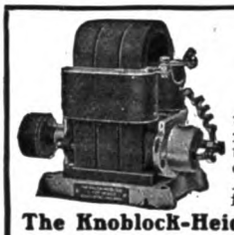
Cold File Finish is a time and labor saver and will bring you more business if you use it. Read this letter;

Winsted, Conn., May, 8, '07.
Cold File Finish Co., Toledo, Ohio.

Gentlemen: Enclosed find money order for $5 for which send us seven cans Cold File Finish. The last seven cans we got are not all used but are going fast. **It is the best labor saver we have run against. JOHN DARCEY & SON**

You cannot afford to be without it. Booklet and testsmonials on request. **Price, 75c a can or seven cans for $5.00. EXPRESS PREPAID.**

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"QUICK ACTION"
IGNITING DYNAMOS
Excel all others!

The only generator that cannot lose its magnetism. For either make and break or jump spark work. Also spark coils. Send for Catalogue B.

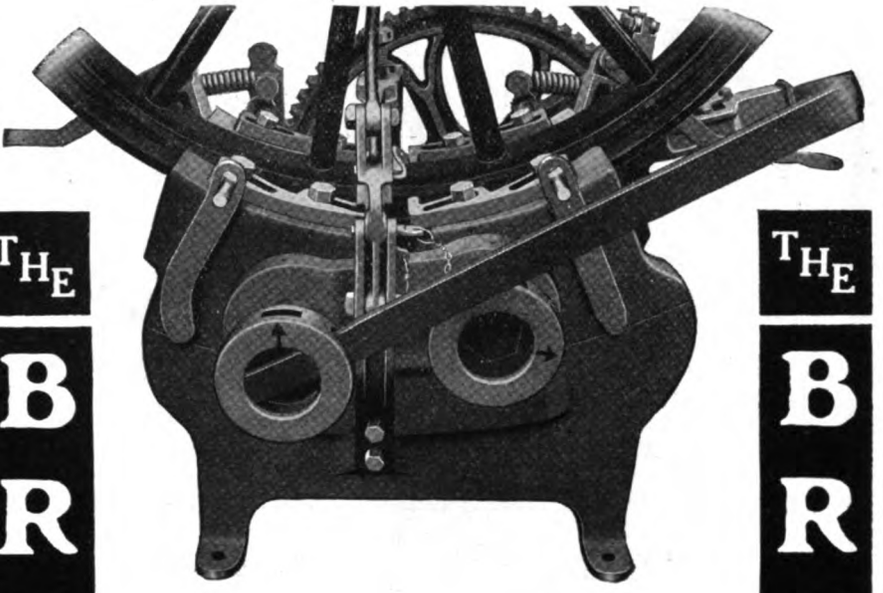
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THE BROOKS

has all the good features of other tire setters besides several special features of its own which our patents protect. This is the tire setter that will do your work quickly and do it properly, the tire setter that is most widely used and giving universal satisfaction; the only tire setter made with a key adjustor and the necessary lateral or side movement of the draw heads, so that they line up with the tire and cannot bend it edgewise. Let us tell you all about this wonderful machine. Drop us a postal for more information. We make easy terms for payment. Write today.

The Brooks Tire Machine Co.
121 N. Water St. WICHITA, KANSAS.

THE BOURNE-FULLER CO.
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TOOL STEEL DEPARTMENT
I. C. SCOTT, Manager.

What those who have dealt with us longest think of our service.

Cleveland, O., June 19, 1906.

To Whom it may Concern:

We get best results with our tools when we leave the selection of Tool Steel to Mr. Scott. Anything he will recommend is good enough for us.

THE AMERICAN SHIP BUILDING CO.
Omer N. Steele, Local Manager.

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Buffalo 200 and 306 Blowers

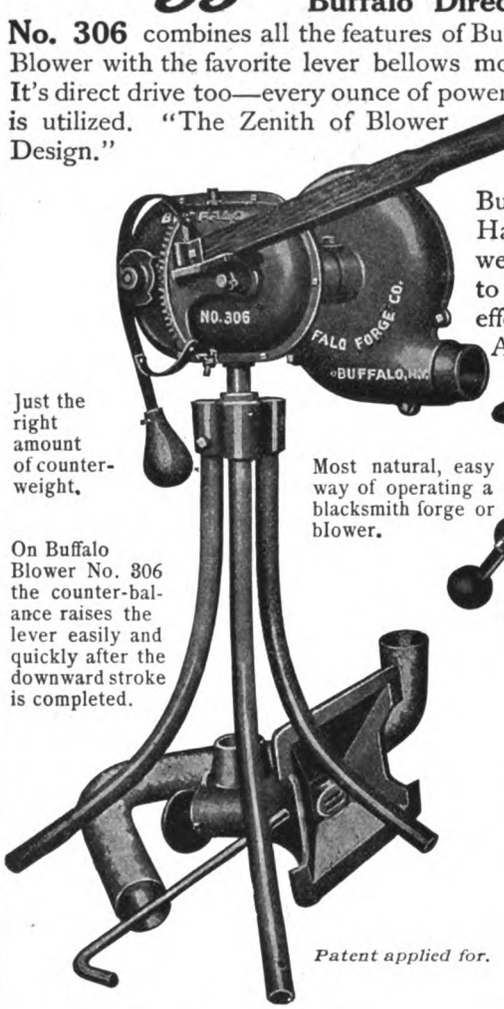
Buffalo Direct Drive Blower

No. 306 combines all the features of Buffalo No. 200 Blower with the favorite lever bellows motion. It's direct drive too—every ounce of power is utilized. "The Zenith of Blower Design."

GUARANTEED FOR FIVE YEARS

GUARANTEED FOR FIVE YEARS

Buffalo Nos. 200 and 306 Geared Hand Blowers are guaranteed to outwear any others on the market and to produce a stronger blast with less effort than any other blower built. Any parts wearing out in five years will be replaced free of charge and no questions asked.



Just the right amount of counter-weight.

On Buffalo Blower No. 306 the counter-balance raises the lever easily and quickly after the downward stroke is completed.

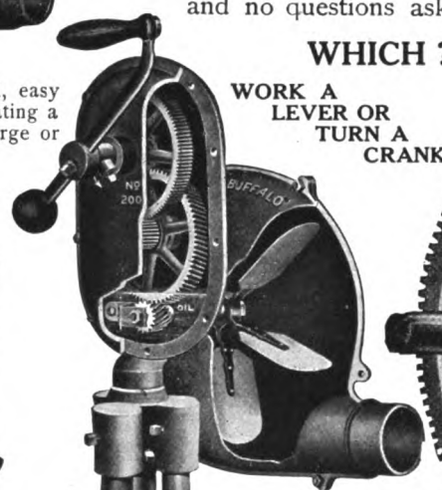
Patent applied for.

Buffalo Direct Drive Blower No. 306 with new H. H. Tuyere.

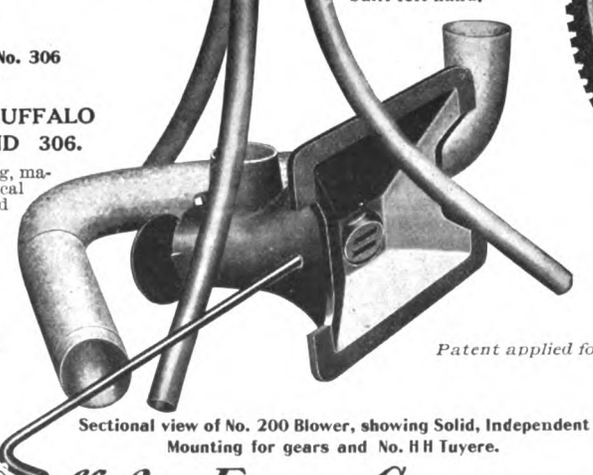
WHICH ?

WORK A LEVER OR TURN A CRANK?

Most natural, easy way of operating a blacksmith forge or blower.



Crank turns opposite to hands of a clock. Cut shows right hand blower—can also be built left hand.

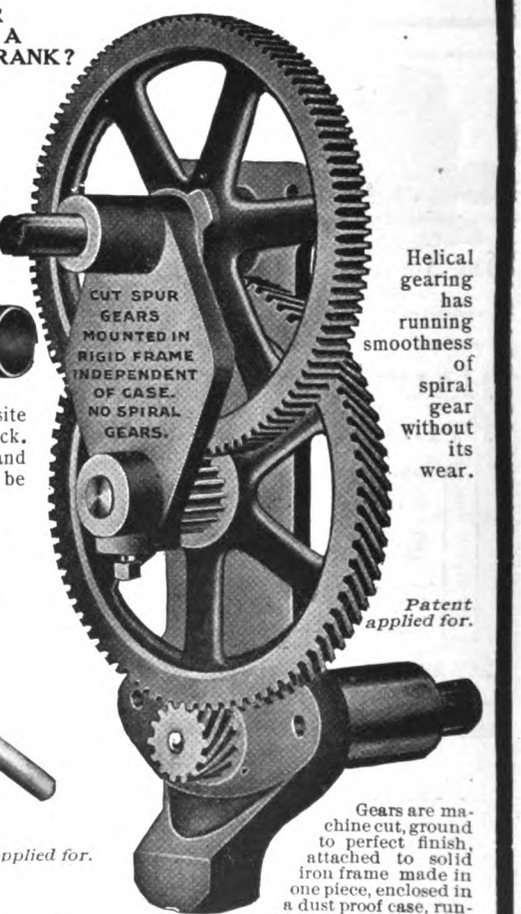


Patent applied for.

Sectional view of No. 200 Blower, showing Solid, Independent Mounting for gears and No. H H Tuyere.

GEARING.

No Spiral Gears to wear out.



Helical gearing has running smoothness of spiral gear without its wear.

Patent applied for.

Gears are machine cut, ground to perfect finish, attached to solid iron frame made in one piece, enclosed in a dust proof case, running in oil. A perfect self-oiling machine.

TELLING POINTS OF BUFFALO BLOWERS NOS. 200 AND 306.

GEARS—Heavy, with large, strong, machine cut teeth, cut spur and helical variety, which reduces friction and increases efficiency.

BEARINGS—Bored from solid castings and reamed to gauge, ensuring perfect alignment and easy, silent running.

OILING—Gears constantly run in oil, keeping the working parts perfectly lubricated.

New 1907 Catalog sent on request.

Sold by Best Dealers Throughout Entire World.

Buffalo Forge Company
Buffalo, N.Y.

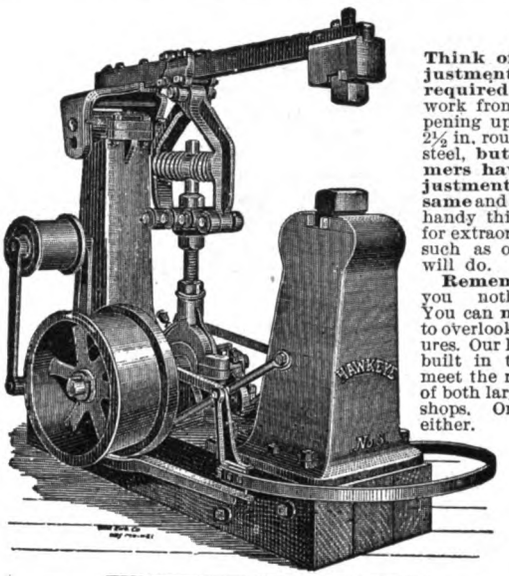
Canadian Friends Buy of The Canadian Buffalo Forge Co., Ltd., Montreal, and Save Duty.

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FOR LESS MONEY

than any other power hammer on the market of equal QUALITY and CAPACITY



Think of it, no adjustment of stroke required to handle work from plow sharpening up to welding 2½ in. round or square steel, **but our hammers have the adjustment just the same** and it is a mighty handy thing to have for extraordinary work such as our hammers will do.

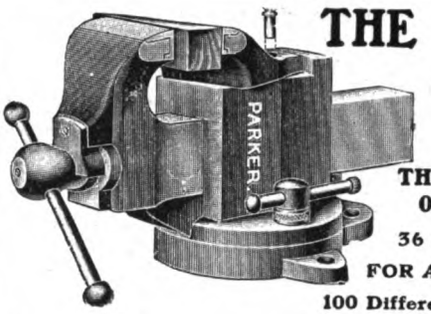
Remember, it costs you nothing extra. You can **never** afford to overlook these features. Our hammers are built in two sizes to meet the requirements of both large and small shops. One H. P. runs either.

For price and full description, address the

HAWKEYE M'F'G CO.

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THE MOST RELIABLE ON THE MARKET

36 Different Styles,

FOR ALL PURPOSES,

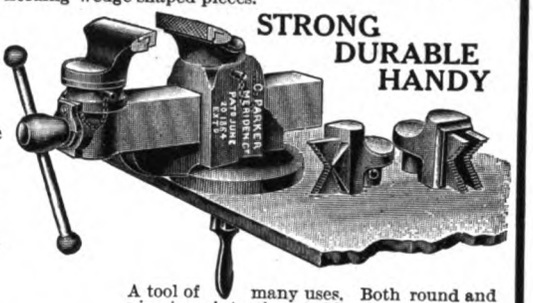
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Parker vises will be found in the best equipped shops in the country. No other vise has given to the trade such general satisfaction. Our new line of improved vises has reinforced sliding jaws, making the Parker vises stronger and more durable than ever.

Made of a blending of steel and best iron in the castings.

The steel faces on these vises are milled and fitted to the jaws and are removable. Have self-adjusting back jaws which automatically adapt themselves for holding wedge-shaped pieces.

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DURABLE
HANDY



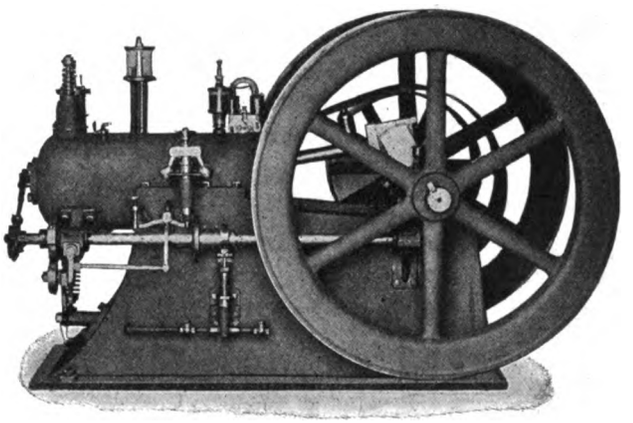
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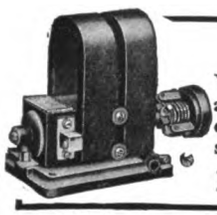
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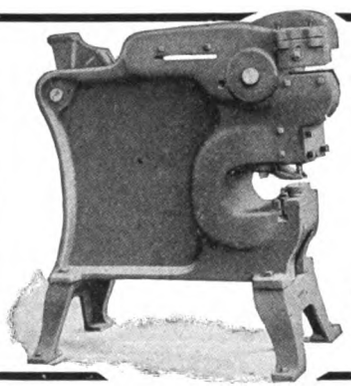
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Punches 5/8 in. hole through 5/8 in. iron.
Shears 5 in. x 1/2 in. flat iron bars.
Shears 1 1/4 in. round iron bars.
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Our large descriptive circular will interest you. So will our price.

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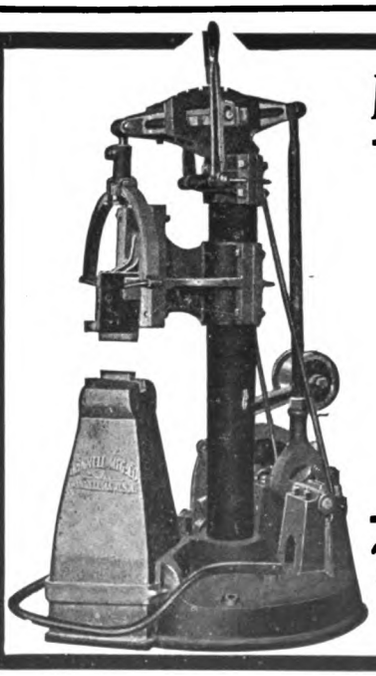
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We make any size wheels to fit any skein.
We manufacture a complete line of metal wheels for corn planters, cultivators, plows, etc.
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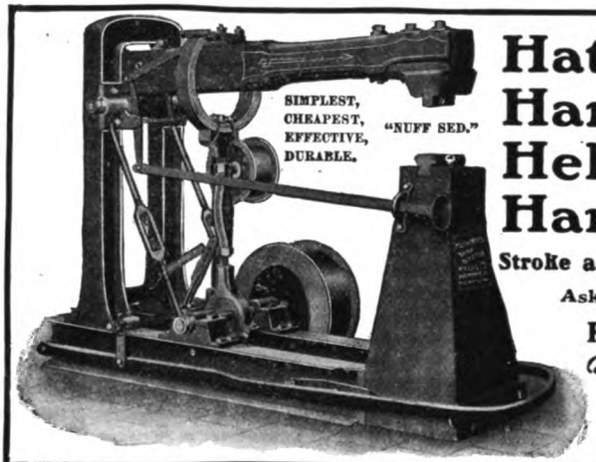
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For Plow Work, Wagon Work, Heavy Work, Any Work.
"The boss power hammer you sold me four years ago has given entire satisfaction."
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EMERY WHEELS CUT QUICK
A wheel that will do the work in one-fourth to one-half less time is by far the cheapest in the long run. A wheel that will save only one hour per day during your busy season would pay for itself in full.





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have been on the market for over
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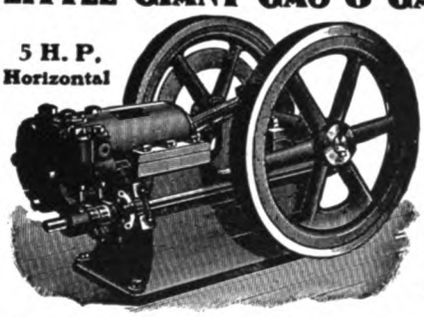


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Stroke adjustable while running.
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Crank Turns Forward or Backward.

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Gears are Phosphor Bronze and Steel, flat and straight cut. No Spiral or Worm Gears.

Fire-pot is 8x9½x4 inches inside.

A powerful blast; lasting after blast

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Can be furnished to operate with the right arm, for left-handed smiths, when desired.



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For use of Large Blacksmith, Wagon, Plow, Railroad Shops, Etc., where Heavy Work is Done, and a First-class Forge and Fire Are Needed.

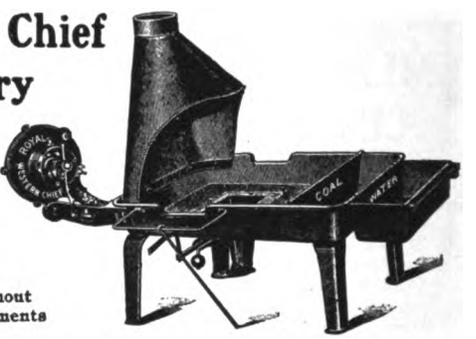
Fan, 12 Inches.
Height, 30 Inches.
Weight, 300 Pounds.
Hearth, 31½ x 45¼ Inches.
Length Over All, 53 Inches.

In this Forge we combine our "Royal" style of Blower with Western Chief Standard Hearth, having Solid Fire-pot with Tuyere Ball Furnishing side and center blast. We guarantee it fully.

Western Chief Stationary Forges

Six Different Styles

With or Without Blower Attachments





ROYAL FIRE-POT

Needs No Clay

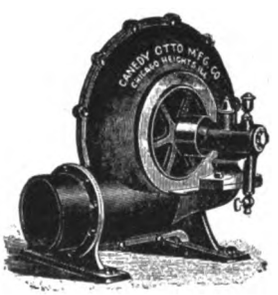
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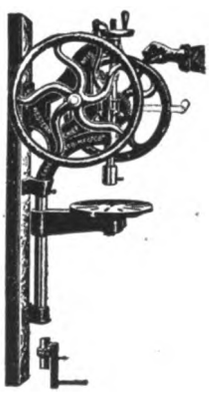
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For sale by first-class dealers all over the world.

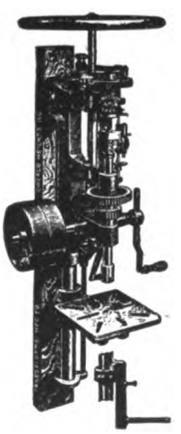


Western Chief Power Blowers

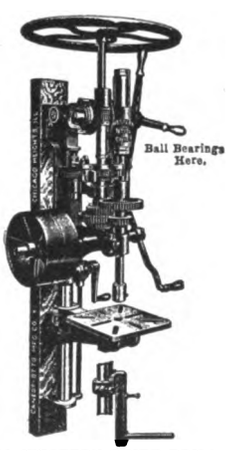
Built in sizes suitable for from one to seven fires



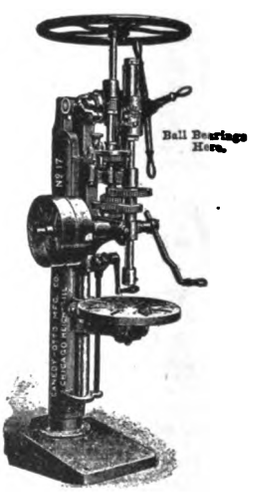
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Automatic Self-Feed.
19 in. Circle.



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Automatic Self-Feed, and the only AUTOMATIC Quick Return Foot Drill Made. 21 in. Circle.



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For All Mowers or Binders



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will save you Time and Money. Their Superior Quality sets a known and tested Standard of Excellence. All made from our own Production of Special Refined Clay Crucible Steel and Tempered by a Secret Process.



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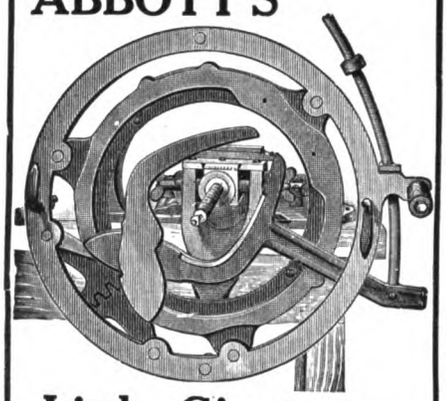


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The superior quality and durability of our "Superfine" Coach Colors, Varnishes and Japans have made their use a *habit* with many leading builders. Let's talk it over.

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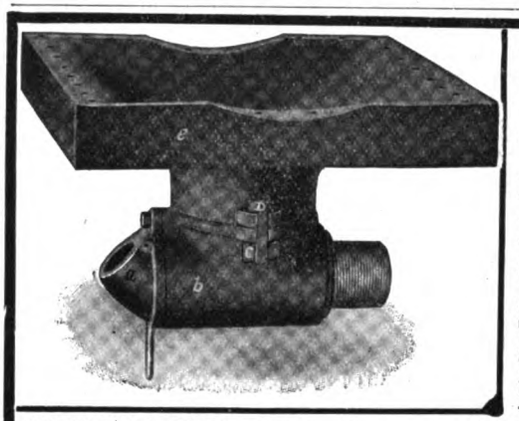


Little Giant Hub Borers

AND Abbott's Box Puller

Made by ABBOTT & CO., Hudson, Mich., and sold by all Dealers in Carriage Makers' Machinery.

PHINEAS JONES & CO., Newark, N.J.
General Agents for the Eastern States



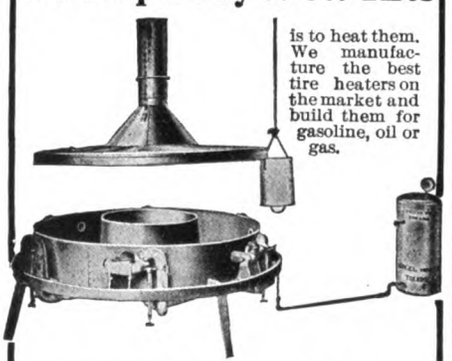
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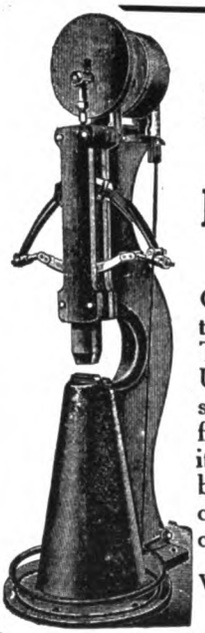
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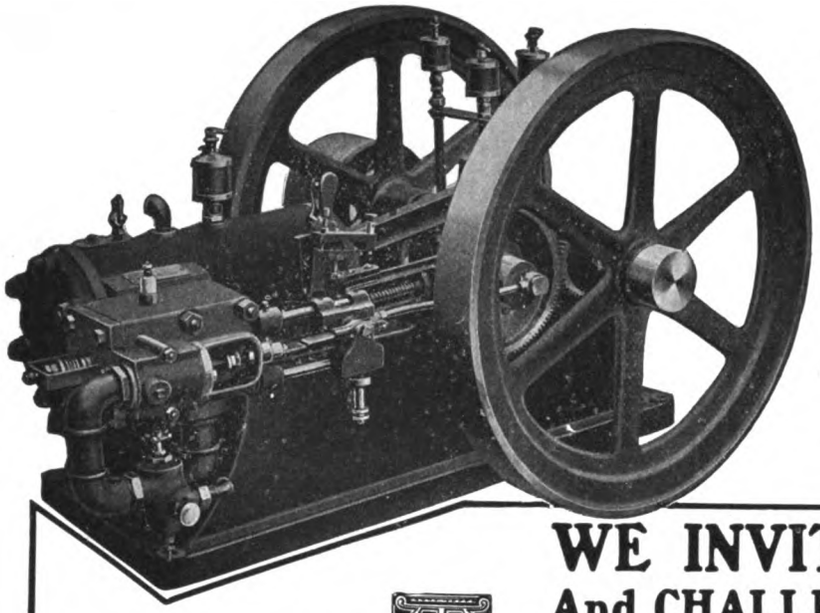
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No Engineer Required.

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5 Punches and Dies with Each Machine.

MADE IN THREE SIZES.

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For Sale by your Jobber. If not, Write Us. Send for Circular.

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In the Natural State

the hoof of the horse comes in contact with Mother Earth and is perfectly bare. This condition permits free access of natural moisture and fresh air to the frog and other parts of the hoof and the hoof being bare, the frog can expand.

For the horse in service it is necessary to protect the hoof from contact with hard roads, and the closer we can stick to nature and yet give the necessary protection, the better for the horse.

Of all hoof protections the "W & B" Rubber Pad Shoe is undoubtedly the best because, being open, it does not cover the hoof, but permits the natural moisture and fresh air to reach the frog and other parts, keeping the hoof healthy, and as the heavy rubber pads at the heel are resilient, and the shoes do not cause the frog to contract, but rather allows it to expand as nature intended.

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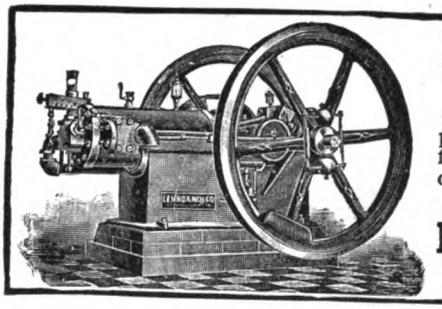
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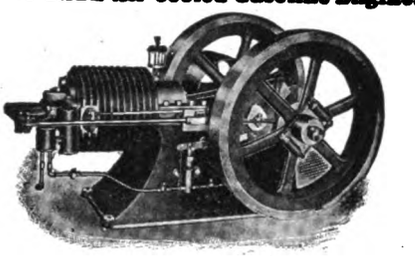
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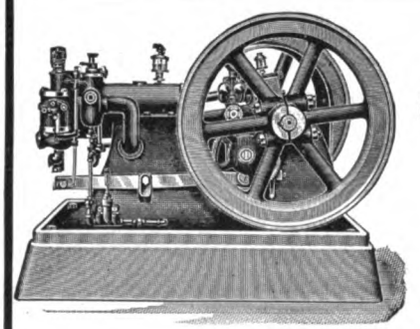
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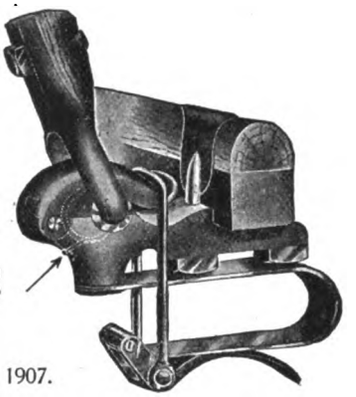
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With Leather Bushings in one piece, securely fastened in the socket of the Coupling.

When the shafts are removed, the bushing does not come out, but stays in the Coupling where it belongs. NO LOST BUSHINGS WHEN YOU USE OUR COUPLINGS.

We would like to send you our circular and have you try our Couplings. They will save you money.



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The Spring is pivoted at the front so that it can be turned forward out of the way of the wrench while clipping the Coupling to the axle.

These are two of the good points, but there are plenty more desirable features in our Couplings.

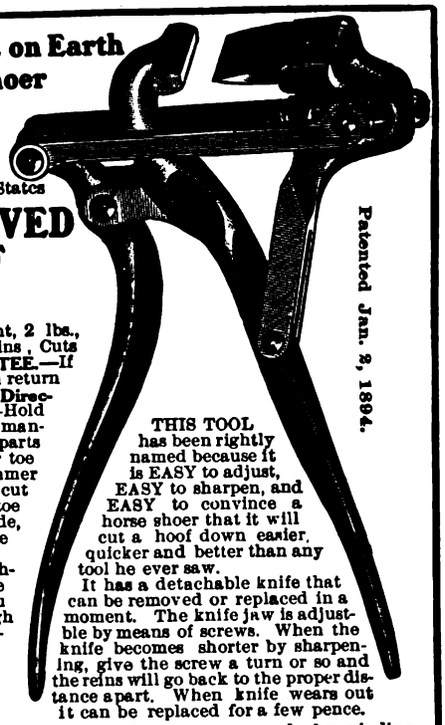
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The BEST TOOL on Earth for a Horse Shoer

Price, Cash with Order, $1.75 Each

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THE IMPROVED EASY HOOF TRIMMER

DIMENSIONS.—Weight, 2 lbs., Length, 12 ins., Opens 2 ins., Cuts 1 in. **OUR GUARANTEE.**—If you don't like it you can return it and get your money. **Directions for Using.**—First—Hold the foot in the ordinary manner and remove soft parts from bottom with your toe knife; then with the trimmer begin at the heel and cut down and around the toe and back on the other side, removing the part at one cut and in one piece. Second.—Avoid all wrenching or prying. Hold the tool as near upright as you can. Cut straight through to the blank jaw regardless of nails or other obstructions, and with very little leveling with the knife or rasp your job is complete.

THIS TOOL has been rightly named because it is EASY to adjust, EASY to sharpen, and EASY to convince a horse shoer that it will cut a hoof down easier, quicker and better than any tool he ever saw.

It has a detachable knife that can be removed or replaced in a moment. The knife jaw is adjustable by means of screws. When the knife becomes shorter by sharpening, give the screw a turn or so and the reins will go back to the proper distance apart. When knife wears out it can be replaced for a few pence.

CAUTION.—Don't make the mistake that a great many do by grinding bevel on one side of blade, but keep the bevel equal on both sides, so that it will pass through the hoof straight and not in a strain.

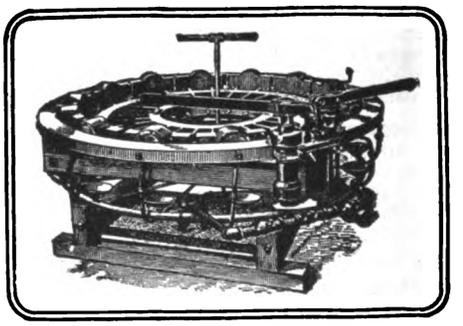
Follow above directions and you will soon learn to use THE BEST HOOF TRIMMER ON EARTH.

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The West Hydraulic Tire Setter



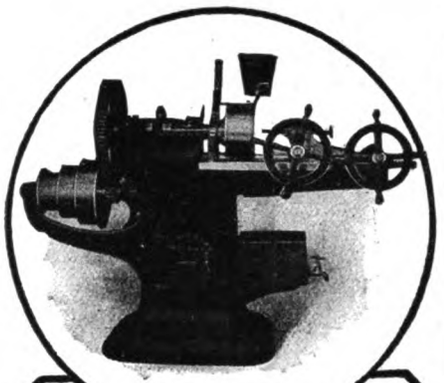
Is a **Round Machine** for tiring **Round Wheels,** and compresses the tire at all points—not all in one spot—and the compression is so slight at any particular point that tire bolts do not have to be removed when resetting an old tire, neither are holes closed so bolts are tight in tire. Wheel is made compact and joints tight.

WRITE US YOUR REQUIREMENTS.

The West Tire Setter Company

ROCHESTER, N. Y.

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FHONT VIEW

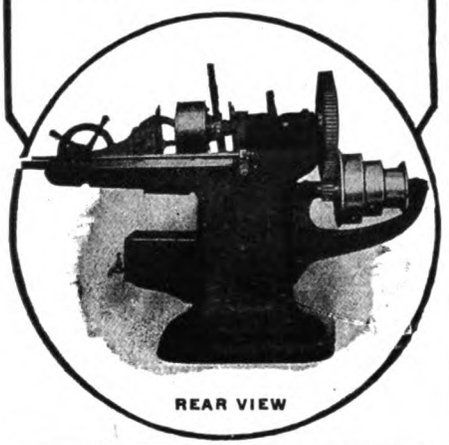
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The Merriman Bolt Cutter Head is Noted for—

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4. SOLIDITY OF THE DIES LIKE A SOLID DIE; consequently,
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6. EFFECTIVENESS OF OPERATION; Cheapest Help can understand and Run it,

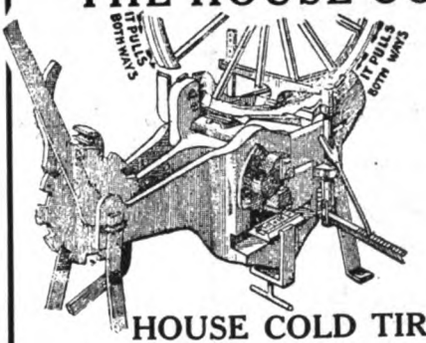
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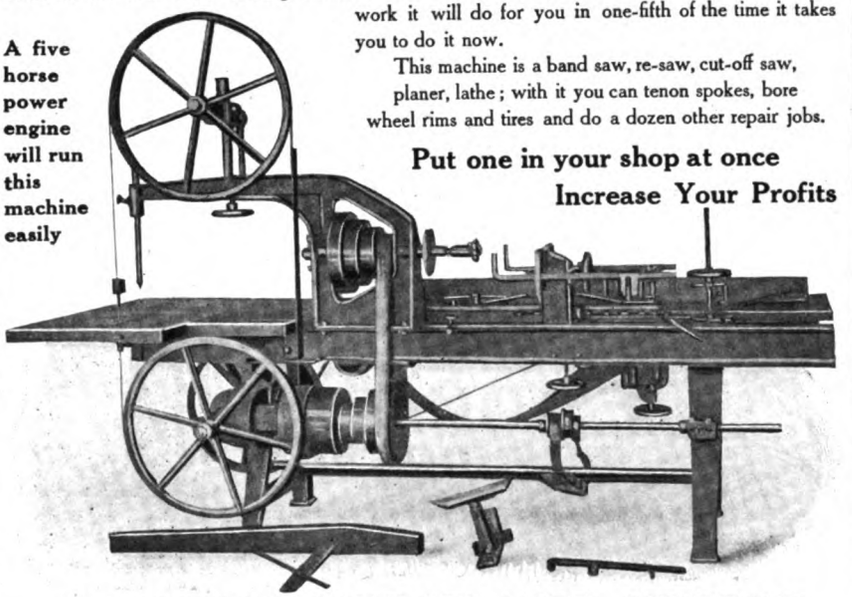
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This machine is a band saw, re-saw, cut-off saw, planer, lathe; with it you can tenon spokes, bore wheel rims and tires and do a dozen other repair jobs.

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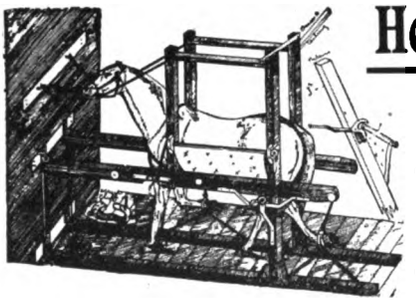


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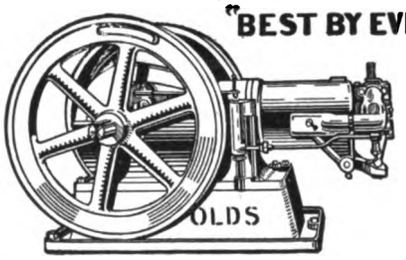
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Weight of ram 30 lbs.
Shipping weight of hammer 700 lbs.
One H. P. to operate.

Specifications of NO. 2 KERRIHARD HAMMER

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Weight of ram 75 lbs.
Shipping weight of hammer 1250 lbs.
Two H. P. to operate

A first-class machine sold at a low price. Contains every modern feature. Strongly built of the best material. Will do your work easily and quickly and will do it right.

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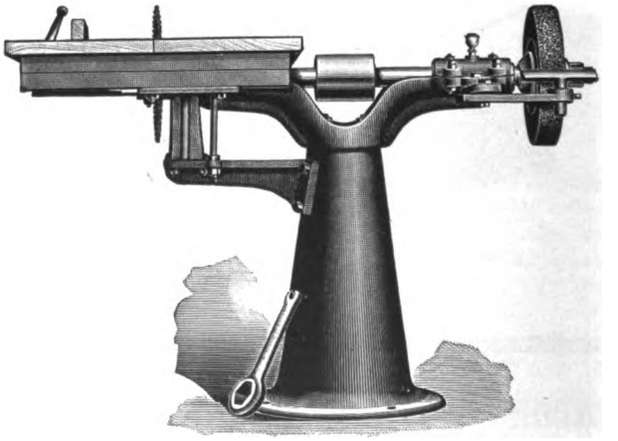
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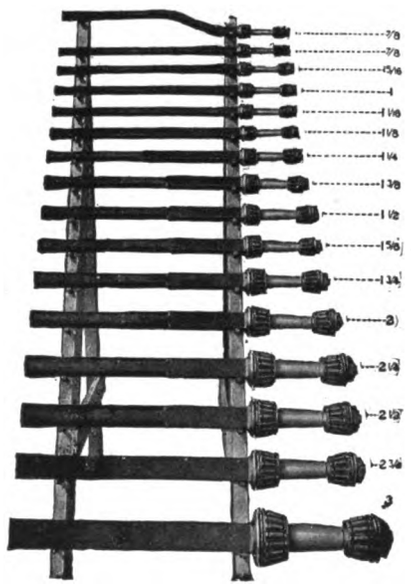
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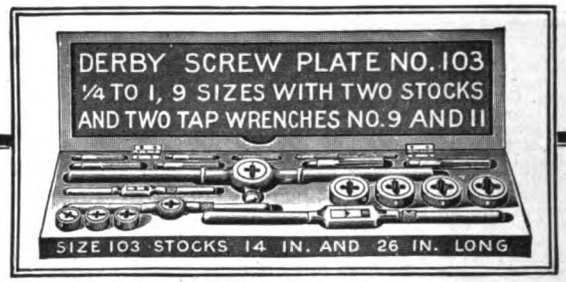
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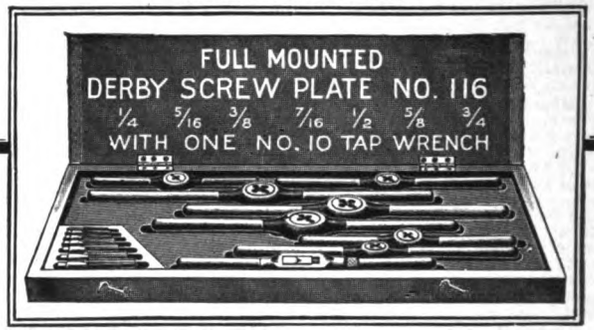
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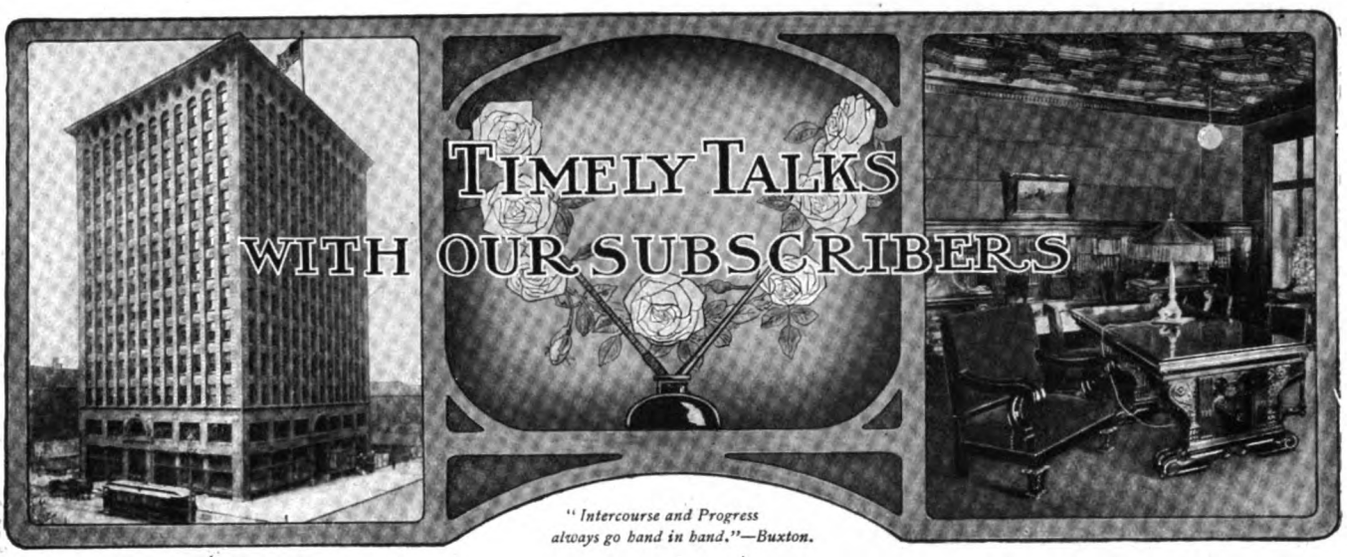
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The popularity of our long-time rates compels us to remark again about them, not only to call attention to this chance for a very materia; saving but to the time limit of these rates. The special low rates are made to get subscribers to renew promptly. It's worth something to us to get your renewal without delay, and to make it worth your while to make it worth our while we give you these exceptional low rates. But we are compelled to limit these rates as good only to subscribers whose subscription accounts are not more than two months overdue. This, we believe. gives the reader plenty of time to decide on our long-time rates, and to advance his account as much as he wishes. The saving we are able to give readers through these special rates is only possible because it stimulates promptness in renewing.

Do you read our "Wanted and For Sale" columns every month? There are many opportunities listed that will interest you. And don't lose sight of the fact that you can use those columns yourself, for advertising an extra machine, to get a helper, to get a new boss, or one of the many other ways that will suggest themselves. These "Wants" are read by thousands of just the men who are interested, and a small liner is sure to put you in touch with just the man you are looking for.

If you don't see what you want in the paper, ask for it. THE AMERICAN BLACKSMITH is published for you, and no one else. It is our aim to serve you not on this page alone, or on one or two other pages, but in every line on every page in every issue of "Our Journal." We want to give you just what you want, what you need, what you are looking for. We want you to take advantage of the question department. One smith writes that this feature of "Our Journal" is alone worth the cost of the year's subscription. If any question on any branch of the craft puzzles you, send it in for solution.

Contents, September, 1907.

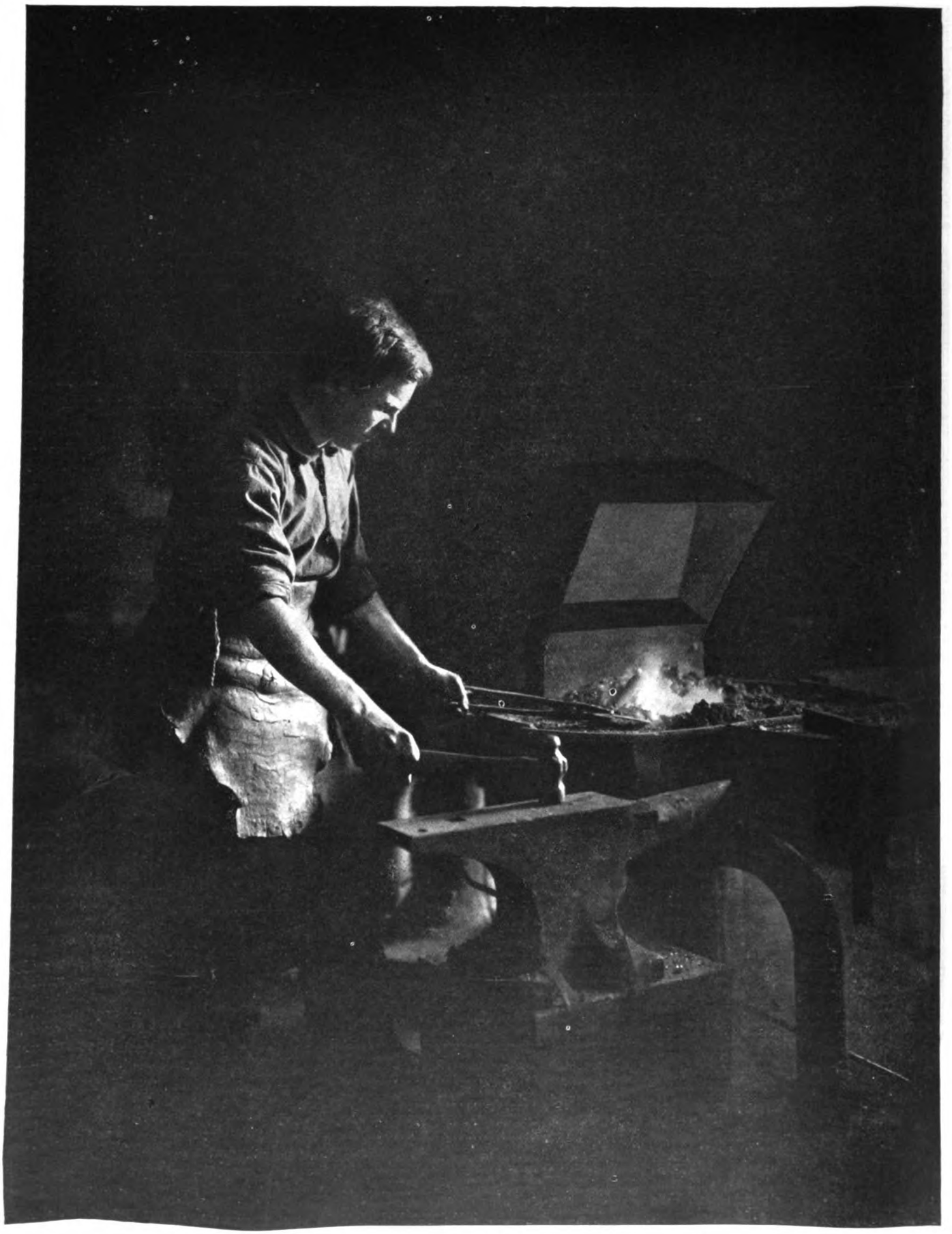
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Have you an engine in your shop? If you have, tell us about it. We are going to tell our readers the how, the why, and the wherefore of power in the shop in an early number and we want your help. We want to know what advantage it has given you—what it has done for you—its cost—if your business has increased and all about the power question in your own shop. Perhaps a good idea would be an article on before and after using power, giving the cost of power and comparing labor, costs, profits, and losses before and after. We want some clever items on this subject and you, Mr. Smith-shop Engineer, can write them by simply giving us the plain facts about your power shop.

Our requests for opportunities were responded to right loyally—readers jumped at the chance to assist their brother smiths. Now we want every single reader to keep this matter in mind. Don't let a good smith shop location pass without advising us of the opportunity. Co-operation must be the watchword of the craft, and we want every reader to help. Show your loyalty to the good old trade.

Another link in our chain of satisfactory service to subscribers: For some time we have been thinking of a printing service for readers. But the carriage charges on the finished printing have never enabled us to serve readers with such a saving as we should desire. Now, however, we have arranged for an electrotype service by which we are able to give our readers neat letter-head, envelope-head, and bill-head settings at a very small cost. The electrotype can then be used by your local printer, he charging you only for paper and printing. When you realize that the setting of the type is usually the greatest item in printed matter you can readily see that our electrotype service will be a very material saving to you. Full information, prices, and other particulars will be given on request.

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THERE IS NO TIME TO STUDY AND CONSIDER WHAT TO DO AFTER THE HEAT HAS BEEN TAKEN. THE METAL MUST BE WORKED QUICKLY AND INTELLIGENTLY

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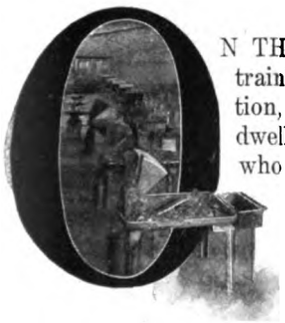


THE FORGE SHOP AT M'KINLEY MANUAL TRAINING SCHOOL IS ONE OF THE BEST EQUIPPED IN THE COUNTRY

The Course in Forging at McKinley Manual Training School

Washington, D. C.

LEROY BIRCH



IN THE importance of manual training as a factor of education, it is unnecessary to dwell, as nearly every one who posesses any knowledge whatever of the work in the schools, has a full appreciation of its value. The boy or girl who has not intelligent use of his or her hands is almost as unfortunate as the one who cannot walk. The ancients devoted most of their youthful time to the training of the hand, while the modern youth have been shunning manual labor as far as possible, and trying to develop his mind. Both practices are wrong to a certain extent: A healthy mind needs manual labor and the crafty workman needs a good mind.

The manual training school is, comparatively speaking, a new institution and was, up to several years ago, somewhat of an experiment. Now, one has only to visit these institutions to learn that this branch of education is well beyond the experimental stage. All leading educators approve manual training schools, and some consider it the only well balanced form of secondary education.



MR. A. B. PIGGOTT, ASSISTANT FORGING INSTRUCTOR AT M'KINLEY SCHOOL

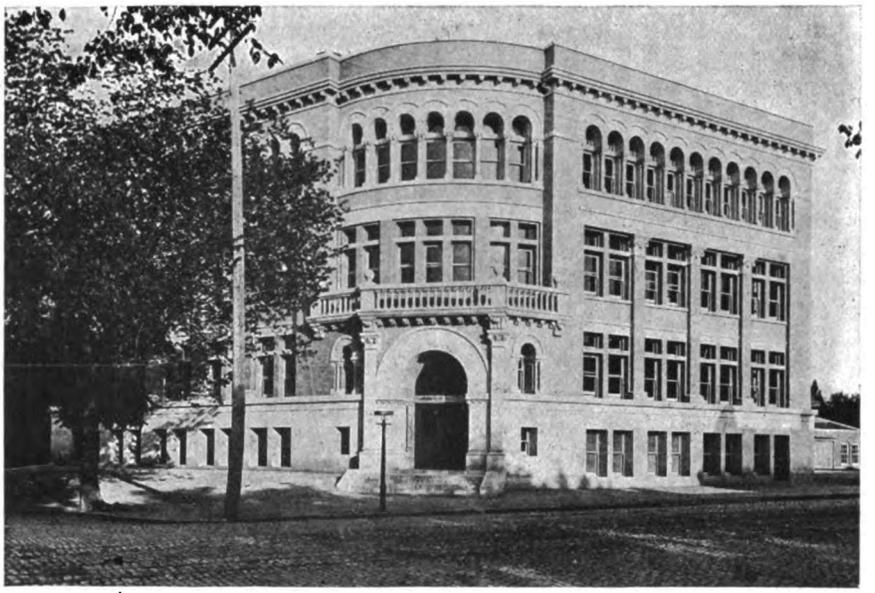
Probably a minority of the pupils of these institutions will become mechanics, and work at a trade, but these will be better mechanics for having had the school training. The boy has an opportunity to learn if he has ability along the line of mechanics, which knowledge may save him mistakes in the early part of his career. If he finds he has not ability, he is better off for having had the training. The unhandy pupil loses a great deal of his awkwardness, and will become a more reasonable and better balanced man.



MR. LEROY BIRCH, INSTRUCTOR IN FORGING AT M'KINLEY SCHOOL

Some instructors do not approve of

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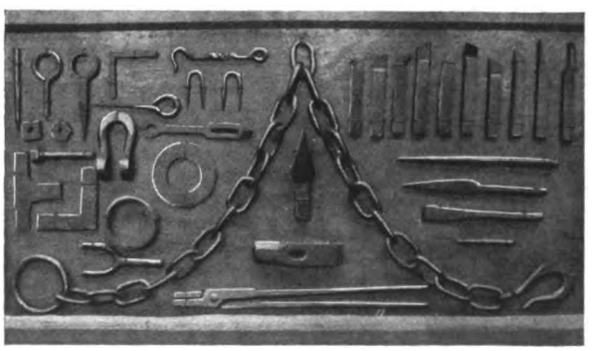
M'KINLEY MANUAL TRAINING SCHOOL AT WASHINGTON, D. C.

art-metal work, but I consider it one of the most interesting and beneficial parts of the work. By art work I do not refer to the cheap, flimsy, cold bent work, but, to work which is beautiful, useful, and above all requiring skill to produce. The boys design their own pieces in the free-hand drawing department, and later work them up in the shop. Some of this work is particularly beautiful. In this special training the pupil not only gets good manual practice, but acquires taste and appreciation of form and design. The special work in steel also interests the boys greatly. When they have attained some skill in handling the metal, and have finished the irregular exercises, they are allowed to make some piece which they can keep, and which will be useful to them: hunting knives, small axes and, in fact, any article which they desire and are able to make. Some of this work is very creditable.

There are, however, some well educated and seemingly reasonable people who question the importance of our work. To prove which I will state an experience of Mr. Granger who, until his death several years ago, had charge of the forge shop in Sibley College, Cornell University. Mr. Granger was asked by some visitors if he thought shop practice was of any real value to the technical student. "Well" said he "you see we take the lads in here and find out if they have sense enough to run a fire and use a hammer, and if they haven't, we send 'em over to study to be lawyers and doctors." It happened that the visitors were prominent lawyers attending a convention at the University. The question, however, displayed as much narrowness, or ignorance, on the part of the learned jurors, as the answer did on the part of the blacksmith.

The McKinley Manual Training School is a modern and well equipped institution. With a scientific high-school course, four very complete shops are operated. In these shops are taught wood turning, pattern-making, foundry and machine practice, and forge and art-metal work. I will endeavor to state what we teach in the forge shop and how we teach it.

The equipment consists of twenty down-draft Buffalo forges, one Fairbanks power hammer with 250-pound ram, served by a large circular forge, one Badger combination punch and shear, six heavy vises, one 18-inch double Norton emery stand, and one Reed power drill-press. An 8-h. p. motor operates the blower, and a 15-h. p. motor runs the exhaust fan and the tools requiring power. The shop is 40 by 60 feet paved with cement and lighted by 14 large windows and a 20 by 10-foot sky light. The interior walls are of white, glazed brick.



SOME OF THE WORK TURNED OUT BY STUDENTS AT M'KINLEY SCHOOL

The list of regular exercises are as follows:

No 1—Drawn point (square), ⅜-inch round stock.
No. 2—Bent eye, ⅜-inch round stock.
No. 3—Drive eye, ½-inch square stock.
No. 4—Ninety-degree angle, ⅜-inch square stock.
No. 5—Hook and staples, ⅜-inch square and ½-inch round stock.
No. 6—Square and hexagonal nuts, ½-inch by 1-inch stock.
No. 7—Square and hexagonal bolts, ½-inch round stock.
No. 8—Log chain hook, ¾-inch square stock.
No. 9—Straight weld, ½-inch round stock.
No. 10—Twenty link chain, ⅜-inch round stock.
No. 11—Welded chain ring, ½-inch round stock.
No. 12—Flat welded ring. ¼-inch by 1-inch stock.
No. 13—Flat welded band, ¼-inch by 1-inch stock.
No. 14—Welded angle (flat), ¼-inch by 1-inch stock.
No. 15—Welded T (flat), ¼-inch by 1-inch stock.
No. 16—Welded T (round), ½-inch round stock.
No. 17—Clevis (upset and punched), ½-inch by 1-inch stock.
No. 18—Split Y (rounded), ½-inch by 1-inch stock.
No. 19—Hasp (punched, chiseled), ¼-inch by 1-inch stock.
No. 20—Straight lip tongs, ¼-inch square stock.

STEEL WORK.

Cold chisel ⅜-inch octagonal stock.
Cape chisel ⅜-inch octagonal stock.
Punch ⅜-inch octagonal stock.
Machine tool bits (8) ⅜-inch by ¼-inch stock.
Hammer (2 lb.) 1⅛-inch square stock.

After the pupil has completed the above list of tasks special work is provided, such as ornamental hinges, lock plates, door knockers, fire sets, etc. Very creditable special work in steel is also produced. The forge work is taught in the second year, and four hours a week are devoted to it regularly, but special time is frequently spent on it by boys who are particularly interested.

As every smith knows, the art of forging cannot be acquired from books unless the student has had previous actual experience in the shop. This the majority of manual training pupils have not had, and so, no regular text-book is used. The boys are first taught to build and keep a fire properly, and I will say that this is the most difficult task the instructor has to contend with. It is very hard for them to see how the fire can be the most important thing there is about the work, (I know a lot of

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smiths, by the way, who are just like them) and they will neglect it, in spite of everything that is done or said. It is "break up your fires" or "clean your fires," or "use more fuel," or "less fuel,"



ARTISTIC HINGES, KNOCKERS AND ESCUTCHEONS FROM M'KINLEY SCHOOL

from morning till night, day after day, till the instructor is hoarse from talking about it. After the pupil has run a fire for a lesson or two, he is allowed a rod of iron and hown how to get the end to a welding heat and hammer a square point. Here I might just incidentally mention that there seems to be an inborn mania in all boys (and some men), to hammer iron after the color has left it. After this fault is somewhat overcome the first exercise is started. From the foregoing list of tasks it will be readily seen that most of the principles of forging, in an elementary form, are gone over in the course. A practical demonstration by one instructor is given, of each exercise, while another man points out the important moves, and explains the wherefores. It does no harm to strike a blow here and there to help the boy along if he is in a tight place. In fact, some of the inapt lads would never get through the course if they were not boosted over some of the hills, but this should be done only in cases of necessity. It is rather more to the point for the instructor to work *with* rather than *for* the pupil. I always take the trouble to know each of my pupils personally, and try to keep their good will. I think this is the most important thing I have to do, for it is essential to success in the shop.

Probably more difficulty is experienced in teaching forging to pupils who are not apt in mechanical work, than in any other branch of manual training. In other branches, numerous tools and machines are used to produce the required results, but in the forge shop the hammer is practically the only tool used. Hence more depends on the deftness of the worker's hands. When the heat is taken there is no time to study and consider what to do next, but the metal must be worked quickly and intelligently. For this reason forging has always been considered a most excellent manual training. Quick wits and nimble fingers, working together, will be found with the good smith.

Unfortunately, in these days, young America seems to have a distaste for manual work. I think the master mechanics have been largely to blame for this, in not making the trade learning more attractive to the apprentice, but I think also that the young men are getting so "nice" they are ashamed to soil their hands.

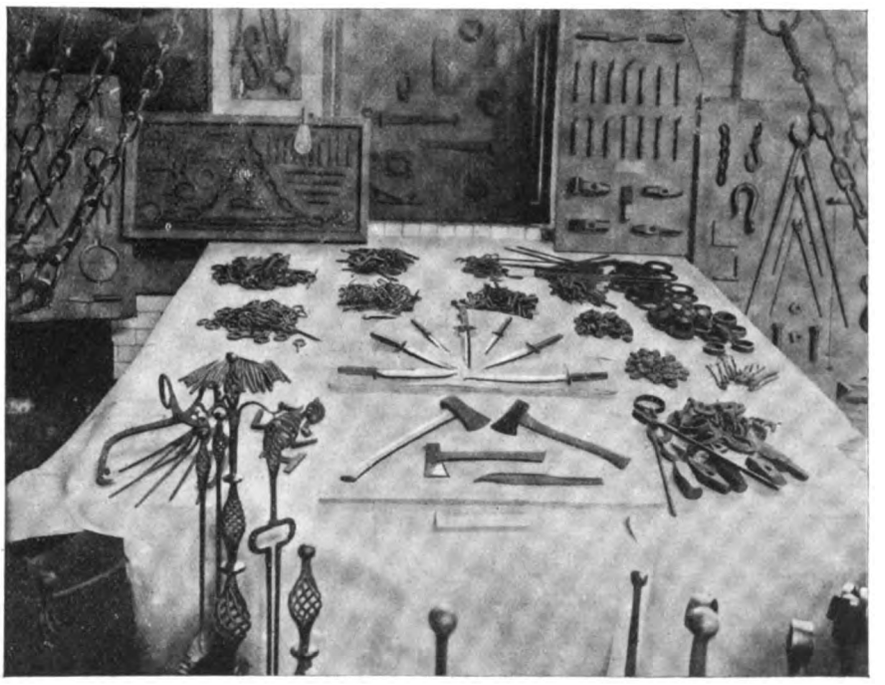
It is right in this connection that the technical school is making good. The boys get an insight into mechanical work, and find it is interesting to be able to make things. They get a good education along with their shop practice, and in a short time in a regular shop are able to hold up their end with men who have worked much longer than they. I think we will find a large number of mechanics in the future who are ex-pupils of manual-training schools, and these I think will be the best mechanics, because they will possess the necessary education to make a success of their trade. The graduate of the manual-training and technical high school has already made an excellent showing, and still greater success is assured for the future.

The Worshipful Company of Farriers in England.

JOHN PETT.
England.

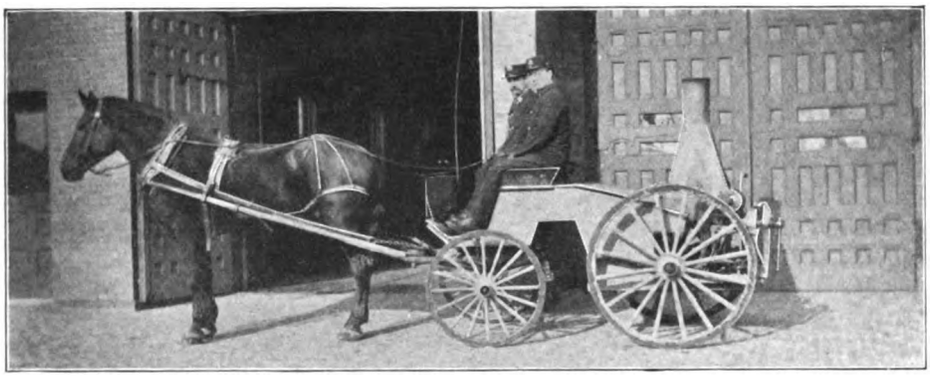
This company is one of the most ancient of the many trade guilds that exist in the city of London. It was originally incorporated in the fifteenth century, so you see that it is by no means a modern institution.

In 1891 the Guild inaugurated a scheme that makes provision for the registration of farriers. Candidates for registration are in the first place submitted to a practical examination in the science of farriery. Those candidates who pass through this ordeal successfully are upon the payment of certain small fees, and after undergoing various preliminaries, admitted to the Society, and placed upon its Official Register. They are also permitted to attach the letters R. S. S. (Registered Shoeing Smith) after their names. All smiths who have been successful in winning prizes, and gaining distinctions, are admitted to the Society free, the fees being remitted. This Worshipful Company includes journeymen as well as mastermen in its ranks, so you see that it is a Society that is for the interest of all classes engaged in the smithing industry. The Society issues an annual Register, giving the names and addresses of all qualified members, together with a list of prizes, if any, which they have won.



A TABLE LOAD OF PRACTICAL THINGS FROM THE FORGES AT M'KINLEY MANUAL TRAINING SCHOOL.

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THE SHOEING SHOP IS BROUGHT TO THE HORSE IN MINNEAPOLIS

Examinations are held at stated periods in various parts of the country, for the benefit of those who are desirous of becoming members. At the period when I first became a member (1892) the fees, payable at entrance were 30 shillings (about $7.30) for masters and 20 shillings ($4.87) for journeymen, but since that time, they have, I believe, been reduced. The management of this Society is vested in an Excutive Council, consisting of men who are prominently connected with the veterinary and smithing professions. The present headquarters of the Guild are 104 Leadenhall St., London, and the clerk is B. F. Popham, Esq.

English smiths find it greatly to their advantage to belong to this Society, as members are almost invariably employed in preference to non-members. To say the least, the Worshipful Company of Farriers is a decided boon to smiths of every grade, and I have not the slightest doubt but that if through the medium of your valued journal something of the same description could be formed in the States it would be of great advantage to the farriers there. If I can supply you with further information respecting this or any other subject connected with English farriery, I shall be most happy to do so.

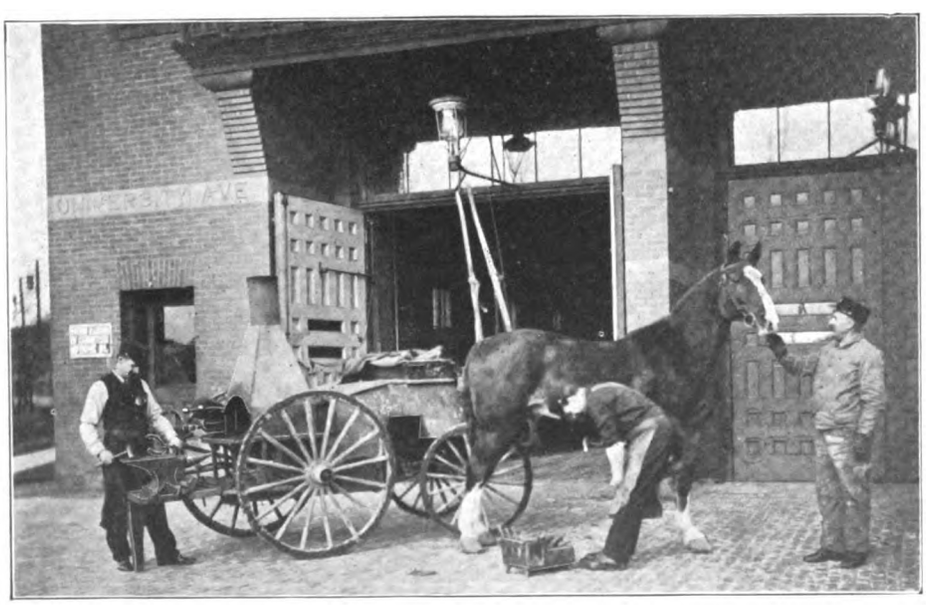
Bringing the Shop to the Horse.

The fire department of the city of Minneapolis instead of taking its horses to the shoeing shop brings the shoer, shop and all to the horse. The shoeing outfit consists of a special wagon built and designed under the supervision of Chief Engineer Canterbury, and carries a complete shoeing outfit, consisting of a forge, a blower, an anvil, a vise, and all the necessary small tools. Sufficient stock and supplies are carried for the day's calls and it is altogether a very economical arrangement for the city fire department. Other cities have already copied the plan, and we will undoubtedly soon find some general smith enlarging on the idea and making tours of the country.

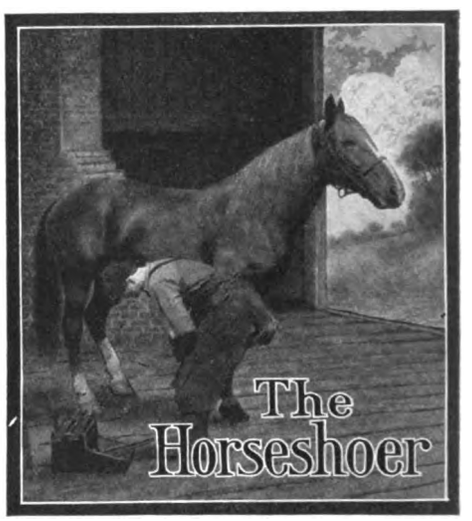
It is not likely that the shoeing smiths in the cities where the traveling shoeing shop is used are favorable to this arrangement, but the economy of the device is very apparent. The shoeing is done by city employees. The department at Minneapolis has 180 horses, and by this arrangement all are available at a moment's notice. Should any horse be under the care of the shoer when an alarm is sounded the animal that draws the shoeing shop is used in its place. This insures prompt and efficient service at all times.

There is no reason why the general smith cannot enlarge on this traveling-shop idea and solicit business and deliver the "goods" right on the spot. A large van should be sufficient to house ample living apartments, and also the blacksmithing outfit. A team of good horses will enable the shop to be moved through the country.

The engravings shown herewith are used through the courtesy of *Popular Mechanics*.



THIS SCHEME IS WORTHY OF IMITATION BY COUNTRY GENERAL SMITHS



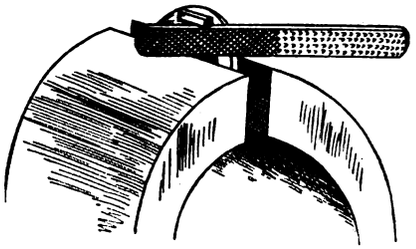
A liquid blister that is very easily made and applied is composed of the following: 1 pint of alcohol, ½ pint of turpentine, 4 ounces of ammonia, 1 ounce of oil of origanum. This is applied every three hours until it blisters. Care must be taken not to repeat treatment oftener than once in eight days as it will kill the hair.

W. E. R., New York.

For Hoof Bound or Tender Feet use a hoof liquid composed of one-half pint of linseed oil, four ounces of turpentine, six ounces of oil of tar and 13 ounces of origanum. Shake well and apply around the top of the hoof every three days. This liquid is also excellent in other cases where a good hoof ointment or liniment is needed. Apply at night and the horse can be used every day. A. M. MOORE, Illinois.

Scratches is a diseased condition of the heels, which usually makes itself known by a scabby condition of the foot just underneath the fetlock and finally by a discharge of fetid matter from the affected part. Careless grooming of the feet is the cause. In the many cases which have come to my attention we always used sugar of lead dissolved in water. The solution was applied by means of a swab or brush, painting the affected parts as often as

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PULLING CALKS OFF OLD SHOES

convenient. This treatment with careful grooming and thorough drying of the feet after washing never failed to cure even the worst cases. W. O. J., Ohio.

Pulling Calks Off Old Shoes.

J. W. KOSAK.

One brother speaks of using a pair of tongs for pulling off the old worn toe calks. I have what I think is a much nicer way. Heat the toe of the shoe to a good, high heat and put the shoe in your vise so that the toe calk will be from $\frac{5}{8}$ to $\frac{3}{4}$ of an inch above the vise jaw. Now take an old rasp and stick it in between the vise jaw and the calk, bastard cut side to the calk. Now pry the calk off the shoe. This never fails to take off even those most worn, and by this method I run no risk of a pincers slipping off the calk and pinching my fingers.

Ingrowing Quarter.

A. F. LIBBEY.

An ingrowing quarter is principally caused by the ground bearing of the foot being out of line with the cannon bone. For example, the horse with an ingrowing quarter is nearly always a good bred one, with sloping shoulders, and narrow though full chest, and his legs are near together. To get a proper place to work, the shoer pulls the foot out sideways away from the horse while he is dressing the foot. This throws the outside point of the toe up. The foot is then dressed so that it looks level when he is at work on it pulled out from the horse, but when let down and back under the horse the outside point of toe is low. We have shifted the bearing on the pedal bone so that the larger part of the weight of the horse comes on the inside quarter.

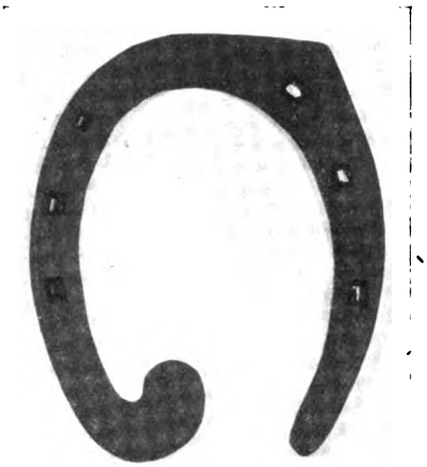
The laminae that holds the pedal bone to the outer shell are divided into points, through these points we get the expansion of the foot. The outside of the foot being low the points of the laminae at the inside quarter are crowded together as the pedal bone settles to a level before the full weight of the horse is thrown upon them. If the points of the laminae are crowded together in any part of the foot, circulation and expansion of that part are impaired. Is it any wonder that we get as a result corns, quarter cracks and sidebones? What shall we do? Hold the foot in your hand so that it will hang under the horse. Dress the foot so it will look level from that point instead of pulled out away from the horse. For shoeing I use a half-bar shoe with a point at outside toe as shown in the engraving. Remove inside heel, have one-quarter-inch space between shoe and foot after shoe is nailed on. In making half bar have a thick, heavy pad, short and flat. If convenient have owner give a shower bath of cold water, with strong force, on outside of foot once a day. Follow directions and the foot will improve.

A Special Case of Interfering Hind.

E. W. PERRIN.

In writing articles for THE AMERICAN BLACKSMITH I have repeatedly laid stress upon the irrefutable law of cause and effect as applied to the science of horseshoeing. I have tried to show that the causes of interfering being various, the treatment must vary, also. In fact the discovery of the cause suggests the cure. It is time enough to experiment when every effort to discover the cause has failed.

The mare which forms the subject of this article is the property of a local transfer company, and is a very fine standard-bred mare about 16 hands high. The picture shows her to be a very fine specimen of equine beauty, but her usefulness was seriously impaired on account of her interfering behind, she was hitting both fetlocks



A HALF-BAR SHOE IS USED WITH A POINT AT OUTSIDE TOE

with the inside of the opposite foot, until they were bruised and bleeding.

The mare in question being in the pink of condition, and well built, with the exception that both hind legs (see Fig. 2) are inclined slightly outwards. But this of itself is not enough to cause interfering, hence I began to suspect the feet or the shoeing On examination I found the mare shod with an outside weight, anti-interfering shoe. The hoofs were high on the outside and the sole pared much too thin. This, then, is a case of unlevel feet, a case of interfering which is properly chargeable to improper shoeing.

In the first place it is a grave error



AN ESPECIALLY FINE SPECIMEN OF EQUINE BEAUTY BUT INCLINED TO INTERFERE BEHIND

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to pare the sole of the hoof too thin, thus robbing the sensitive structure of its natural protection, and thereby leaving it exposed to injuries from nail wounds, bruises from stones and the shrinking process which results from the immature horn being thus exposed to the drying influence of the atmosphere. This of itself is enough to cause interfering in some cases. Again, the shoes while being properly forged anti-interfering shoes, and properly fitted, they were not the proper shoes for this particular case, and the hoofs being high on the outside, the shoe thick and heavy on the same side—a preventative in some cases—were factors in the cause of interfering in this particular case. The conformation of these limbs indicates a hoof slightly high on the inside, which plan I adopted, as you see in Fig. 2.

The remedy here was to restore the natural level of the foot (in this case high on the inside) and to equally distribute the weight in the shoe, by replacing the outside weight, previously worn, with a lighter shoe of even weight



FIG. 2—SHOWS THAT BOTH HIND LEGS INCLINE SLIGHTLY OUTWARD

all around. I removed the old shoe shown in Fig. 3, then lowered the wall on the outside and rolled the wall on the outside quarter. I then took a light steel shoe, and to get the inside toe high enough I welded on a small

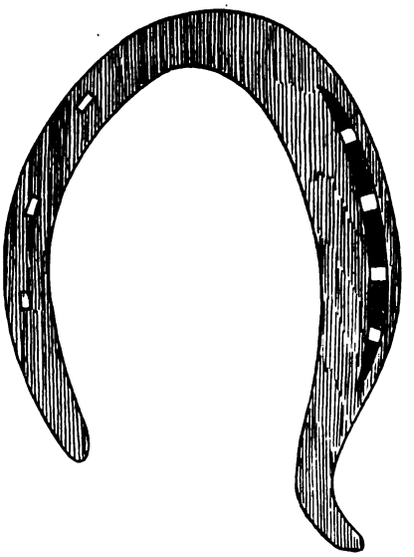


FIG. 3—SHOWING THE SHAPE OF THE REMOVED SHOE

slug, as in Fig. 4. This shoe sets the feet slightly high on the inside, and the roll on the outside quarter assists the foot to break away to the outside, thus enabling the foot to pass wide of the opposite fetlock. This mare was shod by me on the 26th, and the owner told me on the 29th that she had not struck a "lick", since she was shod. You are not to conclude from the above that the next case which comes along will be cured by the same treatment, this would hold good only when the causes are precisely the same. So that in the question of interfering is involved a careful study of the immutable law of cause and effect; without which all is haphazard guesswork.

Thornton's Letters.—10.

Being "Straight-from-the-shoulder" Talk from a Prosperous Self-made Smith to his Former Apprentice, now in Business

Dear Jim:

Yes, I'm back home, old boy, and feeling like the proverbial fighting-cock. And we had an excellent time. Mrs. T. is still talking about your cozy little country place.

But to get to business. Don't worry about that chap out at the Cross Corners. I've been thinking since I was down there that he was more hot air than anything else. You'll do well not to pay any attention to him at all. That chap is all talk and nothing else. It reminds me of a story friend Schroeder told awhile ago about a neighbor who called on the crossroads smith and after gassing gossip for about half an hour the neighbor suddenly remembers that he called to get the loan of the smith's ladder because his house was afire. That's just the way with lots of men, they forget what they're in business for. They go 'round "shooting off their mouth," as old Uncle Johns used to say, and when it comes to business why you usually find them on an excursion.

And you've got the upper hand on the whole outfit in your town because of your gas engine. That will help you a whole lot, old boy—but I think you realize now what a help it is to you in getting better prices.

Now, on that association question. Perhaps I had better come up next month and help get a meeting under way. As I told you when I was there—every one of the other chaps seems anxious enough to form an association, but they seem afraid of each other. I told them who I was when I called on them, and so when I write that letter asking them to meet at Carter's on the 18th they won't be surprised. I wouldn't talk too strong in the meantime if I were you. I got a letter from both Carter and also Andrews the other day and they say they will push the matter for all they're worth. I'll try to get some of our boys to come up to the meeting with me so that we can move those chaps off their feet. I'm pretty sure Jack Tige will come up with me and I'll try to get Art. Fox to come along. They're both very strong association men, and I know they can talk association for days.

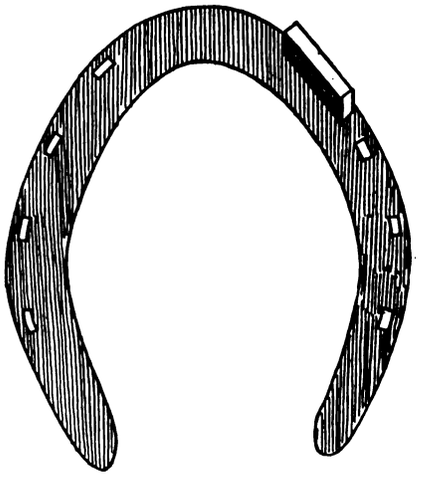


FIG. 4—SHOWS THE SHOE WHICH REPLACED THE OLD ONE

I don't think we'll have any trouble with the boys at all when they get into that meeting and find that their competitors aren't such terrible chaps after all. This matter of prices puts every

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ON A SUGAR PLANTATION IN CUBA. A MODERN METAL-WHEEL SHOVEL DRAWN BY OXEN

man-smith of them on an even footing, and when they get to shaking hands and talking the thing over they'll forget all about competition and price-cutting.

No, Jim, don't let up on your advertising. Of course, it takes money to get out printed matter, but I bet you can trace a big increase in business to that advertising of yours, and you can bet your best hat that you will be getting new customers as long as you advertise. I think it would be a good idea for you to get out a card with your ad. on one side and some interesting thing about the town on the other side: The time the mail comes in or the arrival of trains or something that interests every good citizen. But see that your ad. is in neat style, and see that it says something. And here's a thing, don't try any poetry stunts. I've seen lots of smiths try to tell their business and everything about it in a poem. Don't do it, Jim, unless you can get a genuine Longfellow to write it for you, and even then I'd hesitate about using it. A poor poem is like a poor joke, it's rotten, and a good poem is very likely to call attention away from your card and business.

And here's a little tip I want to give you in pushing new lines in your side-line department—be wide awake to get new things in, and don't be afraid to suggest the new things to your customers. I went into a store the other day and after I had made my purchases the clerk suggested my looking over some new things that had just come in. I did so and ended up by buying several of the new articles. If it hadn't been for the clerk being right on his job I would have bought only what I had come into the store to buy. It's a good thing to apply to side-line selling in the smith shop. We've practiced the pushing of new things in our smith-store and find that it pays good and big, and then people like to be shown new stuff. So when you get a supply of new style wagon jacks or axle grease don't fail to tell your customers and show it to them. But use tact, old boy—don't go at the thing wrong end to.

In closing, let me remind you of what I said about that first meeting, put on your coat of good humor and make up your mind to forget the "recent unpleasantness" with your competitors.

Yours for harmony,

Thornton

Automobile Repairs.

E. F. LAKE.

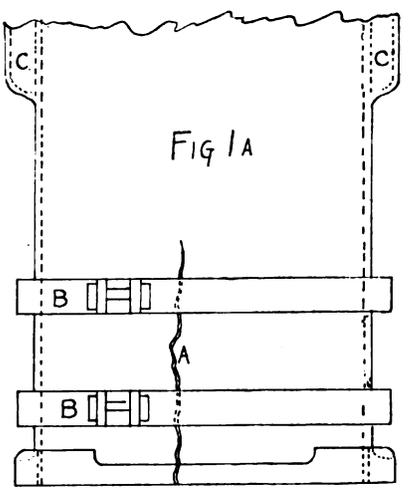
Among the breakdowns which occur to automobiles in touring the country quite a number are caused by the cylinder cracking, either from the strains to which it is subjected in traveling over the rough roads, or from the explosions of the gases.

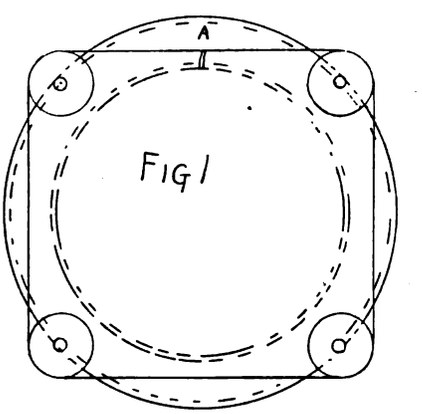
If these cracks occur in the bottom of the cylinder, as shown at A in Figs. 1 and 1A, they can be repaired by putting bands of steel around the cylinder and drawing it together with a bolt, as shown at BB, Fig. 1A.

Owing to the piston covering this part of the cylinder, when at the lowest point of its stroke, there will be no leakage, unless the crack should extend up past the water jacket shown by CC. This would make it reach above the top ring of the piston, causing a leakage of the exploding gases, and when a cylinder is cracked above that point the only remedy is a new cylinder, as the water jacket prevents its being repaired. If the engine has more than one cylinder the smith can disconnect the piston rod of the cracked cylinder, take it and the piston out and allow the engine to run on the remaining cylinders until a new one can be obtained. If a crack starts at the bottom, however, the cylinder should by all means have a band or two put on, as shown at BB, to prevent this crack from spreading up into the explosion chamber, and thereby ruining the cylinder.

Cracks may sometimes occur in the outer shell of the casting that forms the water jacket. These can be repaired by putting a plate of steel over the crack, drilling holes through the plate, and tapping holes in the cylinder shell to correspond with these, and screwing the plate on with machine screws. By putting packing between the plate and the cylinder leakage of the water can be prevented.

Many breakdowns are caused by the failure of the engine or crank case, especially where these are made of aluminum, which is the practice of





CRACKING OF THE CYLINDER IS VERY LIKELY TO HAPPEN TO THE TOURING AUTO

about seventy-five per cent of the automobile builders. In the main there are three styles in which these cases are suspended from the frame of the automobile, and Figs. 2, 3, and 4 show these different styles. Fig. 2 has short

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feet and is hung to the automobile frame with an extra piece, as shown at M, which is usually of steel.

These seldom break, but when they do it is easy for the smith to forge out another one to take its place. The breaks usually occur on the foot of the aluminum case, as shown at P, and as aluminum cannot be readily welded, these engine cases have six feet, and usually two of them break at the same time, while in many cases three of them will break off. But the smaller engine cases have only four feet, in which case it is usually only one that breaks.

In Fig. 3 is shown a case with long feet extending to the frame of the automobile and hung by an angle iron

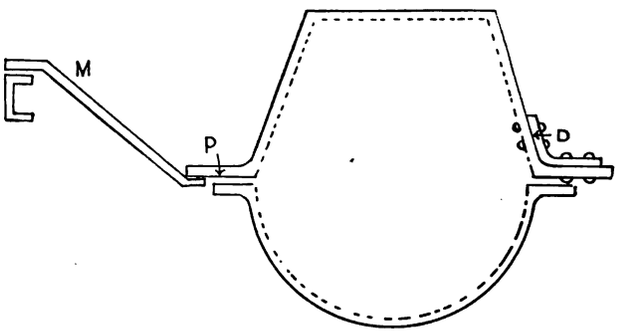


FIG 2

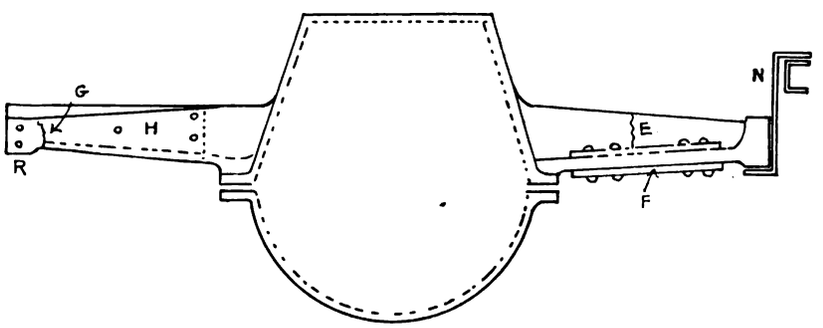


FIG 3

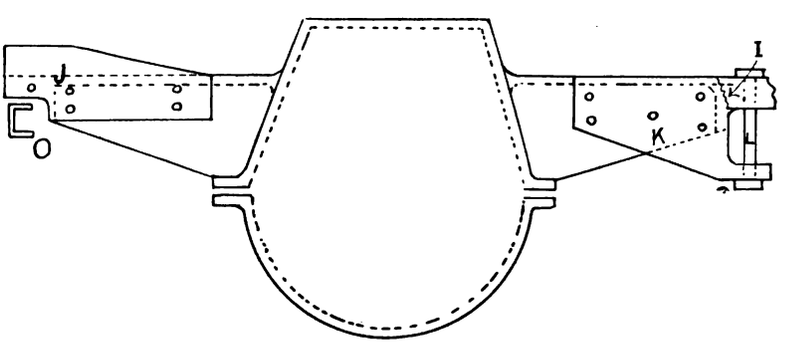


FIG 4

THE UP-TO-DATE SMITH WILL DO WELL TO STUDY THE AUTOMOBILE SO AS TO BE ABLE TO ASSIST THE TOURIST AND TURN A PENNY INTO HIS OWN POCKET

brazed, or soldered to other metals which are in the possession of the smith resource has to be had to rivets. Thus, about the only way such breaks can be repaired is by fitting and riveting a piece of steel to the case, as shown at D. In most cases, ribs are cast on both sides of these feet, which makes it more difficult to fit and rivet the piece of steel. A large percentage of as shown at N. These feet are generally made U-shaped, with the metal about one-quarter of an inch thick. If the break comes near the center of the foot, as shown at E, a plate can be fitted on the inside and another on the bottom of the foot, as shown at F. These when well riveted will make the case as strong as it was before the break, but if the break should come near the end, as shown at G, it will be necessary to fit two plates, one on each side of the foot, and by allowing them to project slightly past the bottom of the foot, R, they can be filed so they will be an exact fit in the angle iron, N, at this point. It is important that the foot fit exactly, so that the engine and its accessories will fit and work the same as they did before.

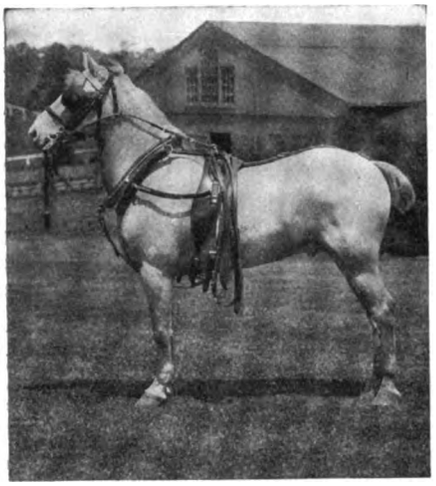
At Fig. 4 is shown a style of crankcase in which the feet extend out far enough to rest on the top of the frame of the automobile without the use of a second piece as shown at O and, owing to this design usually being more complicated, this style of case is more difficult to repair and make as strong as it was before. The break almost always occurs as shown at I, and the simplest method of repairing this is that shown by the plates, J, one of which is riveted to each side of the foot, as is plate H, Fig. 3. It is not always possible to use this method, as the foot being very thin where it rests on the frame it is necessary to make the plate raise above it in order to get the proper strength in the plate, and as there are many times, other parts of the mechanism arranged so they will interfere with this, other means have to be resorted to, and the plate as shown at K is probably the easiest and best. This is cut out so it will fit over the side member of the frame shown at O; the ends forged so they will have stock enough to pass the bolt L through them and the frame of the automobile; then they can be riveted to the case; this placed in position and the holes for the bolts drilled.

Aluminum does not hold rivets as good as steel or iron, therefore, the plates should be made to cover as much of the crank case as possible and as many rivets used as is conducive to its strength.

In making these repairs it will be found necessary to take apart much of the mechanism of the automobile, and trouble will be experienced in reassembling unless each part is marked so it can be put back in the exact position it was before. If they are not put back in the same rotation in which they were taken off, some part may be all bolted on and then have to be taken off again to connect it with some other part before it is fastened in position.

Before putting two parts together great care should be used to remove all grit or foreign substances from the surfaces that should fit together perfectly. All the moving parts, such

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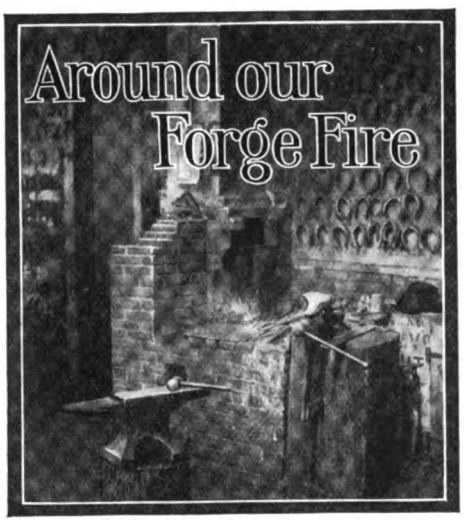
A PRIZE WINNER
WITH GLANCING EYE AND CURVING MANE,
HE NEIGHS AND CHAMPS ON THE BRIDLE-REIN

as the crank shaft, connecting rod, piston, cam shaft, etc. should be thoroughly cleaned and oiled with clean oil before putting in position. The bushings should be marked so each one will fit in the same place it was before it was taken down, for if these are exchanged the shafts will not line up as they should. The bearings should be properly adjusted, and it is necessary to discriminate between a too great degree of tightness and the allowance of too much play. If too tight the shafts will bind and if too loose the engine will rattle when it is run. Every shaft and other part which revolves in bearings should move with perfect freedom after the bearing is adjusted. If the bolt holes in two parts do not come together with ease the bolts should not be pushed in with brute force, but the cause should be looked up as it means that some other part has not been put on properly, and this should be remedied before going any farther or trouble will be experienced, when trying to start the engine, by the straining of different parts. The replacing of pistons in their cylinders is sometimes very difficult, due to the trouble in starting the piston rings into the cylinder bore, but if each ring is given one turn of fine wire and this tightened until the ring is drawn tightly together in the split, each ring can be entered in the bore, the wire clipped off and the ring pushed in the rest of the way. The valve springs can be compressed in a vise and bound together with fine wire and, after placing in position and inserting the holding key, the fine wire can be clipped and removed. All shims should be placed as originally and all gaskets that were not destroyed should be fitted as before taking apart, and finally all bolts should be gone over to make sure that they are tight, and all cotter pins should be looked at to see that they are in place and fastened so they will not work loose.

Satisfied Customers and Advertising.

Satisfied customers are the best advertisements—so some people tell us. And they are, IF they talk about you. But do they talk? How many of your satisfied customers go out of their way to mention a good job you've done for them? You can make them advertise you every day in the year. How? By giving them a "worth keeping" calendar with your business card on it. They will be overjoyed to hang it in their offices—and keep it there. The *American Blacksmith* Calendar for 1908 is a "worth having" calendar that is worth keeping. Keep a sharp eye out for special announcement in next month's journal.

Some people keep a calendar, because it is useful—others, because it's beautiful; the *American Blacksmith* calendar for 1908 is both useful and beautiful.



"Do you get many suggestions from your readers?" asked Benton, glancing over one of the press forms.

"Suggestions!" echoed the Editor. "Well I should say yes. We get all kinds of suggestions. And it surprises one to see how the suggestions conflict. For instance here's a man says 'That horseshoeing stuff is just the very finest I can get. It is certainly O. K. But cut out the anchor and railroad work. What do we care about that?' Then the next chap says 'that article you had in the latest issue on frogs and crossings for railroads is just what I've been looking for. Give us more of this stuff.' Here's a man says 'more Heats, Sparks, Welds and more poetry' and after him comes a smith who says 'cut out the poetry and the heats, welds, and give us more tool work.' And so it goes. I really believe that we have as well balanced a paper as we can get. No one has suggested any very great change in the paper for some time, so I think Our Journal, just about fits into its little notch. We are——".



A STRANGE MOUNT
THE ANIMAL IS A TAME TAPIR AND IS OWNED BY SENOR PAOLINI OF TOROCOCO VENEZUELA

"Say! but that's a dandy picture" broke in Benton. "I'm going to frame that and give it first place in the home." And he again broke into a series of "Ohs" and "Ahs" over the frontispiece of the current issue.

"That is certainly a fine reproduction of a fine picture" returned the Editor. "It may almost be judged a reproduction of a very fine painting, but it is simply an excellent photograph taken in one of the manual training schools."

"It is the finest thing of the kind that I have ever seen and I certainly want an extra copy for framing" said Benton.

Harrington came in at this point and wanted to know how to coat a piece of iron with brass.

"I've got just the receipt you want" replied Benton. "Use a boracic acid as a flux and then dip the piece into a pot of melted spelter. This will give you a permanent coating of yellow brass."

"That's a simple thing to do," returned Harrington.

"Of course," continued Benton, "you want to clean your iron thoroughly before you try to coat it. A soda bath is about the quickest and easiest way. This reminds me of an interesting experiment I saw the other day. I was calling at a certain shop down in the country, and I knew the smith was pretty clever. Well, when I came in he said 'well, you're just in time, old man. I'm going to try something new.' And so with that he took a red hot iron from the fire and immersed it in a bath beside the forge. When he withdrew the iron it was white and shining like silver. I asked what was in the bath and after considerable coaxing he told me that it contained equal parts of powdered ammoniacal salt and mercury. This is then dissolved in water and thoroughly mixed. The iron is then heated red hot and immersed in this solution."

"Well, that is interesting. Guess I'll need to try that. It doesn't appear to be a very bothersome little experiment and maybe the result is well worth it," and with a nod and a thank you to Benton and the Editor, Harrington went out.

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"Before It Is Too Late."

ALVA PRIMMER.

If you have a dear old mother
In the old home far away,
Sit down and write the letter
You put off from day to day.
Don't wait till her lagging footsteps
Reach Heaven's pearly gates,
But show her that you love her
Before it is too late.

If you've a tender message,
Or a loving word to say,
Don't wait till you forget it,
But whisper it today.
Who knows what bitter memories
May haunt you if you wait?
So make your loved ones happy
Before it is too late.

"We live but in the present."
The future is unknown.
Tomorrow is a mystery,
Today is all our own.
The chance the future leads to us
May vanish while we wait,
So spend life's richest pleasures
Before it is too late.

The tender word unspoken,
The letters never sent,
The long forgotten message,
The wealth of love unspent,
For these some hearts are breaking,
For these some loved ones wait.
Show them that you care for them,
Before it is too late.

Written expressly for THE AMERICAN BLACKSMITH.



Do it yet—now is the time.

High time to start that organization.

Firm resolutions make possibilities realities.

It's durable work that makes durable trade.

If you can't be as busy as a bee, be as busy as you can be.

When anybody tries to tell you how to run your business, forget it.

Sunshine makes the shop sweeter, cleaner, and healthier in every way.

A shop full of sunshine is very apt to fill the smith full of sunshine.

If you work for a man, for your own sake, work for him all of his time.

'Tis a good habit to read THE AMERICAN BLACKSMITH regularly—tell your neighbor.

If you don't know how, read THE AMERICAN BLACKSMITH and—tell your neighbor.

'Tis best to rule smokers out of the gas engine room if you don't want them blown out.

What! Forgotten the garden! Get the children interested in it if you haven't time.

"Look before you leap," so that you'll waste no time in looking to see why you leaped.

The best resolution a smith can make is to get better prices—and then continue to get them.

"Do unto others"—and remember that you are one of the others to those who are others to you.

Instead of forging their tablet for the hall of success, some smiths seem to be carving their tombstones.

Drive your business hard—you'll be surprised what a lot of hurrying it'll stand without getting balky.

Don't find fault with the fault finding customer until you are sure you're not at fault. And don't even then.

"One good turn deserves another," said the gas engine as it continued to turn the money into the smith's pockets.

A pruning shears! Yes, many a smith is in need of them to cut out the profitless jobs, the waste and the bad accounts.

And that million and a half record for horse-drawn vehicles for last year seems to indicate that "the horse 'aint went yet."

That old German saying, "One must make the shoe according to the foot," seems to have the horseshoer in mind all the time.

'Tis bad economy to cut the quality of your work or material. Better by far to raise the price if advanced costs cut profits.

A mechanic and a business man must the successful smith be. 'Tis one thing to understand a machine, but quite another to sell it.

Any automobile repairing at your shop? Let us know about it. Every general smith is interested in this new branch of smithing.

That "honest dealings" paragraph is mighty good and is equaled only by THE AMERICAN BLACKSMITH itself. Tell your neighbor.

So you've read the paper from cover to cover! Better go through again so as not to miss a single line. The ads., too, are of value.

The deepest shaft in the world from which coal is being hoisted is said to be at the Products Colliery in Belgium, and is 3,773 feet deep.

To make the buyer buy again—if that's your aim you'll put quality into every job from the making of a calk to the building of a wagon.

The longer at the trade the more a man becomes aware of his shortcomings. 'Tis only the first year or two when a beginner thinks he knows it all.

A smith ought never allow the second horse to step into the same hole in the shop floor, but a careful smith will see there's no hole there for the first horse.

"'Tis not the number you shoe that counts, but can you shoe my horse scientifically, honestly, safely and well?" asks the horse owner these days.

Because your "Grandpop" did is no reason why you should use old back-breaking, muscle-tiring methods. Modern power devices are for modern smiths.

Remember air is as necessary as fuel in making the engine go. No matter what fuel is used a certain amount of air is necessary to make the fuel explode.

You can whittle profits beautifully small, and perhaps make money. But while you're cutting down the spigot of profit, you're digging the bung hole of failure wide open.

"De more oftener a man dinks of his vork, de lesser he vill haf to dink of his vages. Und den aboud dat dime de vages vill purty nearly take for demselves a care," says Hans Pickelburger.

Now's the time to pick out a side-line. Smiths usually have a bit of sparetime and there are any number of opportunities for extra profits presented in our advertising columns.

Seen your neighbor recently? Good chance to call on him now with this copy of "Our Journal." Don't come away without his subscription order. It means six months on your own account.

The village forge in a Pennsylvania town bears the following on a sign over the door:

"We shoe anything that passes,
Horses, mules and jackasses."

Ever figure the time lost in looking for misplaced tools? One place for everything is no place for anything. Have a place for each tool, each tool in its place and a memorandum in your brain of the place.

"Good water, good neighbors, good schools and plenty of work" is how an opportunity in Mississippi state is described. Interested readers can get full information from Mr. J. I. Blansett, of Darbun, Mississippi.

"Rome was not built in a day," said friend Tardy when asked when he was going to repair the large hole in the shop roof. Perhaps T. T. will think of the times he has postponed fixing it when the snow flies.

Discharge him if he isn't interested in his work. Unless he is, the work cannot be done to the satisfaction of either employer or employee. But explain why you discharge him—he will appreciate good sound advice.

"I'm death on loafers—won't have 'em 'round under any circumstances," says Thornton. "There's no place for 'em anywhere. When one comes in and insists upon hanging 'round, why we simply give him a pair of good boots, and not done up, in paper either."

A postal from Ohio shows that Brother Feltz of that state is a strong believer in advertising. Mr. Feltz announces his full line of farm machinery—tells prospective customers where to get their repairing and horseshoeing done, and asks them to pay him a visit. What do you do, reader, by way of putting your name before the public?

"Mighty nice little house Jones built next his shop." "Oh! it's not such a grand place. I'd do the same if I had the money, and didn't have to tend shop so much. Hardly worth while to have a nice home and not have time to live in it." And Tom Tardy knocked the ashes from his

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pipe, purchased a big navy plug and sauntered down the street toward the river.

The blow of a blacksmith's fist is said to have been the cause of the Russo-Turkish war of 1877–8. The story goes that a Turkish tax collector insulted the daughter of a smith in Herzegovina, for which the father knocked him down. In his alarm the smith fled to the mountains where he was joined by a few sympathizers who held out against the Turks until their rebellion grew into a general insurrection and brought on the intervention of Russia.

American Association of Blacksmiths and Horseshoers.

This is going to be a genuine heart to heart talk, so get right down and listen to every word. Just because I write a short item on this page every month and just because I am busy attending to association matters, don't think, Mr. Reader, that I don't read this journal from beginning to end every month. I know what you fellows are saying in these columns. I know how badly prices need raising, and I know too, that a good many smiths could get busy with a county organization if they would only try.

Now I feel that you and I have become pretty well acquainted through this column and I think, therefore, that you will take some advice for what it is worth without getting "out of sorts."

I want simply to say this: Instead of "boiling over" and "howling" about low prices; instead of complaining and trying to comfort each other; instead of knocking the good old craft (yes, some of you do); be up and doing. Work like a beaver these days to get your brother craftsmen round to your way of thinking. When you get them thinking that prices can be raised, that better profits can be made, that a county association is a necessity and can be formed, then you can do things and do them right.

But smoking a "peace pipe" in your own "wigwam" won't do the work. It's visiting the other shops that does the deed; talking to your brother craftsmen about the needs of the craft in your county. When you purchase provisions from your farmer friends they insist upon cash, don't they? They insist upon getting the current price, too. Why can't you do the same? Why can't you get exactly what your work is worth?

An association will do it.

An association will get it for you.

An association will insure you against dead beats, price cutting, unfair competition, and the many other drawbacks to the smith's business.

Now, Mr. Reader, whether or not this letter has hit you, whether or not you have kicked about prices, drop me a postal for my easy plans if you haven't an association in your county. You'll be surprised that an association can be started in your county with such little effort. All I want is for someone—and *you* are the one—in your county to give us a little start. Just a bit of a push as it were, and we'll go faster and faster, gathering strength at each bound until you find a strong, growing association in your county. But do it today, *please*. Address P. O. Box 974, Buffalo, N. Y. And by return mail you will get plans for forming county organizations.

THE SECRETARY.

Price List.

American Association of Blacksmiths and Horseshoers, Mason County, Kentucky Branch.

Four new Shoes, plain	$1.00
" removes	.60
" Shoes, toed	1.40
" " not toed	1.20
Bar Shoes, plain, each	.75
" " calked and toed, hand-made, each	1.00
Toe weights, machine made, per pair	.80
Heel weights, per set	2.00
Hand-made shoes, per set	2.00
Plain shoes, leather oakum and tar, each	.50
Setting 4 tires on 2-horse wagon	2.50
Less than 4, each	.75
Setting 4 tires on 4-horse wagon	3.00
Less than 4, each	1.00
Setting 4 buggy tires	2.00
Welding axles, per inch	1.00
Setting buggy axles	1.00
Setting wagon axles	1.50
Welding hame hook	.15
New hame hook	.25
" cutter plow 1 horse	5.50
" " " 2 "	6.50
Stretcher Chains $\frac{5}{16}$	1.25
" " $\frac{3}{8}$	1.50
" " $\frac{7}{16}$	1.75
Stay and tongue chains, same as above	
Sharpen large shovel plow	.15
" small " "	.10
" bull tongue	.05
" hill side	.50
" land plow	.25
Ironing turn sleds	$7.00 to 10.00
Steel shoes on sled	3.50
" buggy tires, per set	5.00
Filling buggy wheel woodwork only	3.00
Spoking " " " "	2.00
Rimming " " " "	1.25
Half rim " " "	.75
One spoke " " " "	.25
More than 1, each	.20
Filling front wheel 2 horse wagon section rim	5.00
Filling front wheel 2 horse wagon bent rim	4.00
Filling hind wheel 2 horse wagon section rim	5.50
Filling hind wheel 2 horse wagon bent rim	4.50
Filling front wheel 4 horse wagon section rim	5.50
Filling hind wheel 2 horse wagon section rim	6.50
Spoking front wheel 2 horse wagon	3.00
Rimming front wheel 2 horse wagon section rim	2.00
Rimming front wheel 2 horse wagon bent rim	1.50
Spoking hind wheel 2 horse wagon	3.50
Rimming hind wheel 2 horse wagon section rim	2.50
Rimming hind wheel 2 horse wagon bent rim	$2.00
Spoking front wheel 4 horse wagon	3.50
" hind wheel 4 horse wagon	4.00
Rimming front wheel 4 horse power	2.50
" hind wheel 4 horse wagon	3.00
Shaft in buggy	$1.50 to 2.00
Cross bar in buggy shafts	.75
Single tree on buggy shafts	$.50 to 1.00
Wagon tongues	$2.00 to 2.50
Wagon Hounds 2 horse front per pair	4.50
" " " " " 1 only	2.50
" " " " " hind per pair.	4.00
" " " " " one only	2.25
" Axle " " wood only	4.50
" bolster " " old iron	2.00
" brake bar 2 horse	1.50
" axle board 2 horse wagon	2.00
" axle bed 2 horse wagon	$1.50 to 2.50
" coupling pole 2 horse wagon	$1.00 to 2.50
" double tree old irons	.75 to 1.50
Wagon brake bar blocks, each	.35
Repairs on 4 horse wagon, same as above	
Beam in hill side plow	1.75
Helve " " " "	1.00
Handles, per pair with round	1.25
Beam in land plow	1.50
Handles in shovel plow with round, per pair	1.00
Dump Cart shafts per pair	$5.00 to 7.00
Break " " long, each	4.00
Plow double tree	$1.00 to 1.50
Single tree	.75 to 1.00
Turn sleds No. 1	16.00
" " " 2	14.00
" " " 3	12.00
" " " 4	10.00
Tongue in sleds	1.50
Pin Sleds	10.00
Buggy axles, per set	6.00
" stubs, each	1.50
Rubber pads, each	$1.00 set 3.00
Buggy perch straight	1.00
" " bent	1.50
Welding spring	.75
More than one spring	.50
Welding shaft iron	.50

Prices and Price Lists.

A. G. BERGER.

This discussion on published price lists is to me something uncalled for. To my way of thinking there isn't any reason why price lists shouldn't be published. Why should we any more than any other tradesman keep our selling prices a secret? Why should we any more than the grocer, the butcher or the general stores keep mum about our prices? Now let us consider the so-called objections to publishing price lists. In the first place one man says that his price-cutting competitor has a chance to undersell the man who publishes his price list. If the competitor wants your prices can you possibly keep him from knowing them, and do business? Wouldn't you have to refuse to do any work to keep your prices from him? Isn't it an easy thing for the price-cutter to send a friend to your shop and get your prices on anything he wants to know? Then, why object to published price lists on this very unreasonable ground?

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Another man says that by publishing price lists the mail-order house is enabled to know what we sell for. This argument is no argument at all. The mail-order house does a national business, and has no time to spend on individuals. If they tried to undersell each blacksmith or even each county of blacksmiths they would need as many catalogues as there are counties. Mr. A. J. Yeager also says "when goods go up, do we raise our prices to comply with the increased cost of material? I have never been able to do it because my competitor would not agree to." Just let me ask Brother Yeager if a secret price list would enable him to raise his prices any quicker?

I think that the solution to the entire matter is organization. But why published price lists should be objected to even in an unorganized county I cannot understand. Some smiths seem to think that the price lists appearing in these columns are read by the general public. They don't seem to realize that "Our Journal" is a blacksmiths' paper and is of no use whatever to anyone outside the trade. The price question cannot be given too much publicity among the trade, and I think that the prices published every month are a great help—I know they are to me, at least.

And while we're on this subject of prices, suppose we get together on the matter of cost prices. I think it would be an excellent thing for the smiths to send in a list of their cost prices for publication, so we can tell whether we are paying too much for our stock. We are all in business for the money there's in it, and I don't believe we can discuss the money end of it too much.

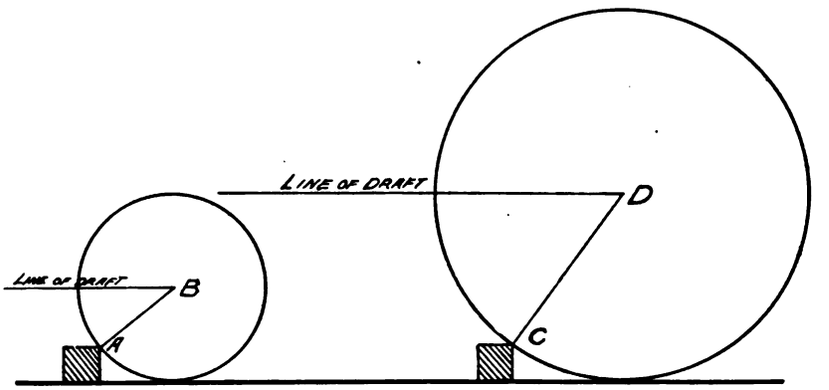
Another Solution of the High-Low Wheel Question.

J. W. DARON.

Brother M. A. Wade in the April issue of THE AMERICAN BLACKSMITH says that a wheel 50 inches high has less draught, or is run with less power, than one 40 inches high, and he accounts for it on the theory that the former has a greater preponderance of weight in front of the obstacles that it strikes than the latter has when it strikes the same or similar size obstacles. Brother Van Dorin in the July number talks on the same subject, and he agrees with Mr. Wade in that the taller wheel of the two has the less draught, but disagrees with him as to the cause that produces it. His own conclusion is that it is altogether a question of leverage, and gives illustrations to prove it.

It is not my intention to cast any undue reflection upon any of the craft, but I wish to say that the supposition that a certain wheel has less draught than one that is lower is an old time theory. But it is rapidly becoming revolutionized, because hardly anywhere now do we find wheels so high as they were some years ago, especially race-cart wheels, which have been reduced from 5 feet to 2 feet.

Let us examine the accompanying engraving and see what it has to tell us. I drew one wheel twice as high as the other for the purpose of avoiding fractions and confusion as much as possible. At first sight the larger wheel seems to have the advantage on the principle of the lever, or that it can be drawn over an ordinary size object, 3 or 4 inches through, easier than the smaller wheel. But when we take into account the extra weight of the larger wheel, which is twice that of the smaller one, it will be found that the power or gain of leverage is in favor of the smaller wheel, although the length from the hub to the block DC is twice that of BA, and that the line is more at a right angle to the line of draught. Thus when the smaller wheel strikes objects which place the angle not above 45 degrees, as shown at AB, and it runs over them easier or with less draught than the larger wheel, how much easier it will run on level pavement. The reason of it is, as mentioned, because it possesses the property of lightness above the larger wheel, and also less friction on the ground and on the spindle. This, however, is not all that is in favor of the smaller wheel, it is a great deal stronger throughout, both laterally and diametrically, is less in the way, and wears much longer. A word more in regard to the principle of leverage, and that is; when the smaller wheel strikes objects so large that it will be above the point A or anywhere near to the line of draught, then the larger wheel has the advantage. But we are not hunting great obstacles over which to run, we are hunting level roads, and that is what we are getting more and more every year, and the little or small wheel with them.



ANOTHER SOLUTION OF THE HIGH-LOW WHEEL QUESTION

Some Recent Advertising in Smithing Circles and a Few Hints.

A. D. SMITH.

The smith-shop owner can get some good ideas for his own advertising from that sent him by jobbers and manufacturers. I am taking for granted, of course, that the reader believes in advertising his business—that he believes in building his business through advertising. And when I say advertising I mean advertising with sense. Not the so-called advertising that jumps into every dance program and other cheap scheme which does nobody good but the printer and the man that's boosting the scheme. There are lots and lots of fake schemes coming into view continually that the sensible advertiser avoids and with good reason.

But a word as to the good, "all-wool-and-a-yard-wide" advertising. By this I mean advertising that advertises. Advertising that brings folks to the shop with their shoeless horses, dull plows and broken wheels. Printer's ink costs money, and when you spend your hard-earned money put it into printer's ink where you can see you're going to win it back, and a few more dollars with it. The weekly newspaper is a good medium for smith-shop advertising and, if you are acquainted with the editor of the paper, an occasional note to him about some especially difficult job will gain for you some valuable advertising in the reading columns. If you do brazing in the shop tell the "editorman" about it, and say, too, that everybody can't do that work.

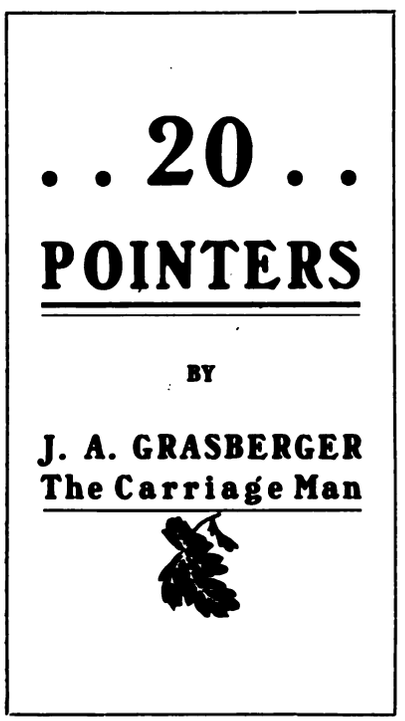
Next to the newspaper comes the

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circular or hand bill. These if rightly handled and distributed will pay well. The usual run of hand bills, however, appear so very poorly that this medium of advertising has fallen into disrepute. The smith should therefore see an up-to-date printer and get up-to-date printing.

A little novelty recently sent out by a southern smith was a book of pins. The book was 2¼ by 4¼ inches in size, and contained twenty common pins on one page of the inside, while on the other page were detailed twenty pointers why a prospective customer should trade at that particular shop. The first, third and fourth pages of this little ad. are reproduced herewith.

Another very good advertising scheme was that engineered by an Illinois smith. He secured a lot of neat, attractive calendars and advertised them strongly in the local newspapers. He offered a calendar to everyone bringing a job worth a dollar or more to his shop. To customers who owed him money he wrote a polite little note and said that if the account was paid before his supply of calendars was exhausted he would present them with one free. This scheme worked very well and, furthermore, helped to pay for the calendars.



Page 1.

To the man who doesn't believe in advertising I would say, don't look for results as soon as the first man reads your advertisement. Results only come from persistency. It's not big space that counts so much as persistency in getting your name and your shop before the folks. If you're advertising in the newspaper change your ad. in every issue, and say something. "J. Brown does blacksmithing" is not near as interesting as to say something about your business. When you get a new machine advertise the fact and invite folks in to see it. There's always something about your shop that will keep up people's interest. If you shod two mules in one forenoon tell about it and who the animals belonged to. There is practically no end to what you can say about your shop so as to bring it in the public eye.

1st Pointer—Fine work a specialty.
2nd Pointer—All work guaranteed.
3rd Pointer—Repairing promptly attended to.
4th Pointer—We lead and others follow.
5th Pointer—If others can't do it, bring it to us.
6th Pointer—Prices right.
7th Pointer—Fine sign work.
8th Pointer—We have ample room to handle all kinds of jobs.
9th Pointer—Only skilled hands employed.
10th Pointer—Any kind of a new job to order.
11th Pointer—We are here to stay.
12th Pointer—See our styles and then compare prices.
13th Pointer—We are always busy.
14th Pointer—Our Motto: Style, durability and strength.
15th Pointer—Always give you what we promise.
16th Pointer—Rubber tires at short notice.
17th Pointer—Watch our painting and decorating.
18th Pointer—Remember the No. **Phone 3427.**
19th Pointer—Bring us your work—we do the rest.
20th Pointer—Our work speaks for itself.
DO YOU SEE THE POINTS?

Page 3.

Cost and Selling Prices and Dies for Power Hammer.

B. D. HUNGERFORD.

I find the price lists from different localities quite interesting, but would like to hear what the smiths are paying for their stock. As all smiths know, prices of wood stock have advanced wonderfully within a couple of years, or have with us, at least, so I wonder how some can keep doing business at the price they charge for their work. For instance, not so very long since I saw where one man put in wagon tongues for $1.50. Does he mean just for the putting in or for the tongue and work? Now our last wagon tongues cost us $1.35, and the freight is 57 cents per 100, so we charge $2.75 for the job. Finished XX double bend buggy poles cost $1.60, XXX D. B. spring wagon poles $1.85, oak bent wagon rims, 1¾ by 2½, $3.00 per set. Most wood stock has advanced in proportion. I am wondering if the prices of stock are about the same all over the country, or have they been sprung by a few jobbers in their territory. I have been informed that this is the case to some extent.

The jobbing house people have been making up a scale of prices for work, and distributing them among the smiths here. The traveling men said they wished to get the smiths together on prices, for they realized they could not hold out without putting them up. One man said they would place the new price lists with the blacksmiths, and those who did not come to them would be blacklisted. This statement put us to thinking and we wondered why they should not want to sell to any smith that would pay for the goods, without regard to what he asked for his work. Then why should not the smiths regulate their own prices through their own organization? It looks like someone might be planning for another rise in stock.

We live in a town of about 600 inhabitants, in the center of Kansas, where wheat raising is the principal farm work, thus bringing our rush in the fall. There are four shops here with six men at work. We have the only shop with power and do probably two-thirds of the work that comes here. We have a Weber Junior gasoline

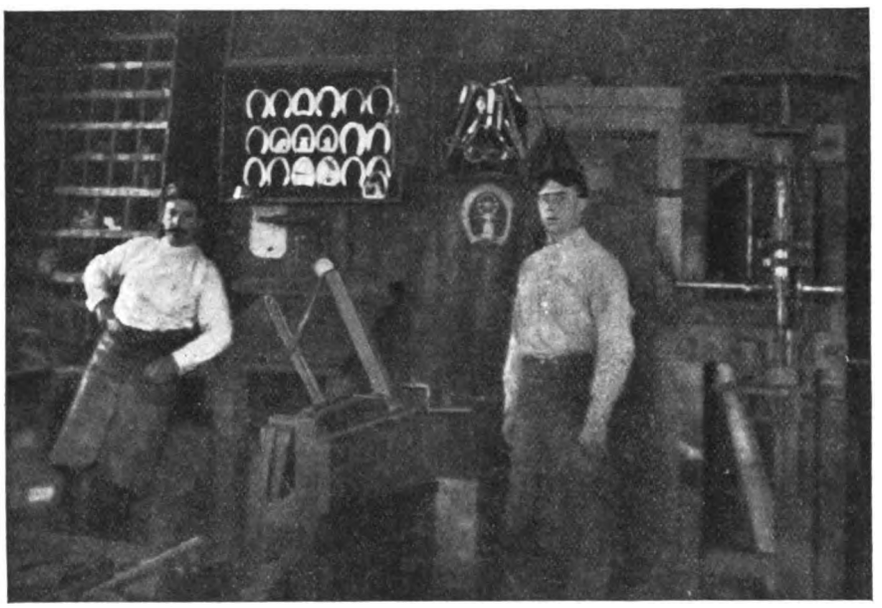
J. A. GRASBERGER
Manufacturer of
Carriages
and
Wagons
FINE WORK A SPECIALTY
Repairing Promptly Attended to
PHONE 3427
20-22-24 N. 20th St. near Main
RICHMOND, VA.

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engine, a Little Giant trip-hammer, an emery grinder, a drill, a felloe-boring machine, a circular saw and a jig saw. We do not run them all at once, however. We advise anyone to get a larger engine if they can possibly afford it, for they will want to add more machinery till a small one will be overloaded as ours is. We find our trip-hammer saves us more hard work than any of the other machines, and if we could not have another I doubt if we would work at the trade. The man that does not have power in his shop does not know what he is losing. The people around here were afraid of the trip-hammer and the other smiths did some lieing at first so we had some trouble, but they are most of them coming our way now. Once in awhile a new one bobs up with an objection to it, but we tell him that if he does not like the job we do he need not pay for it. But they always pay and come again. The most trouble we have is with the men that live near other towns where they have hammers that are not working well. Our success lies largely in the shape of our dies. Most smiths keep the dies so they will do for as many different things as possible, which is a mistake so far as plow work is concerned. A flat die is bad for plows, for the curve of the share requires an oval shape of the lower and a narrow die for the top. A narrow rounding bottom on the top die draws the share out, but not lengthwise. The flat-top die stretches them endwise and soon gets them so they will not go on. The lower die has to be dressed quite frequently as it gets hollow in the top, which makes the work rough. We grind ours off occasionally with the emery wheel and polish it bright, and can finish a share very smooth. If anyone cares to know how we shape our dies I might send a sketch that would make it plainer. I would like to have someone describe the dies they use for special work, say sharpening harrow teeth or anything that the plow dies are not good for.

Speaking of side-lines, my letter head gives mine away. I breed fancy poultry, Single Comb Buff Orpingtons being my specialty. I have sold $125 worth of eggs for setting this year. I aim to keep about 100 hens.



A GOVERNMENT SHOEING SHOP IN OKLAHOMA

A Government Shoeing Shop in Oklahoma.

FRANZ WENKE.

The accompanying engraving shows the interior of my shop. The shop is 30 by 30 feet. It contains a Western Chief Blower, Stoddart Tire Shrinker, and a Western Chief Drill. There is also a set of "Little Giant" plates.

My shop is rather small for the work I have to do. If we have bad weather I have to repair my wagons or shoe my mules outside, as only one wagon or two mules can he brought in at one time. All covered rigs have to be left outside, anyway, as the door is too low to admit even a surrey. But asking for things here at this point does not do any good as the blacksmith has to put up with too many bosses, notwithstanding that he has to know all kinds of work.

In the picture you will see me leaning against the desk to the left. My helper, Mr. Bud Campbell, from Marietta, Indian Territory, stands to the right near the drill.

A Cement Smithy of Illinois.

T. J. HARNEY.

The accompanying engraving shows an exterior view of my smith shop, which is 30 by 40 feet in size. It is of brick with a cement block front and an iron clad engine and machine room attached. The engine and machine room is 20 by 32 feet in size. We do a general smithing business, but make a specialty of horseshoeing. We get good prices for all our work and are kept busy.

An Oklahoma Smith and Machine Shop.

T. J. PARKER.

An exterior view of my shop is shown herewith. My equipment consists of a Weber gasoline engine, two fires, one twelve-foot steel lathe, a double emery wheel, a drill press, a grindstone and a small lathe. All these machines are run by the engine. I also have a cold tire setter, a Barcus shoeing stock, a gasoline brazing forge and other tools too numerous to mention. A few of our prices here are as follows:

Horseshoeing	$1.25 to $2.00
Tire setting, per wheel	.50
Plow work, sweeps, each	.10 to .25
Plow work, breaking, each	.15 to .35
Pointing breaking plows	.50 to .75
Sharpening listers	.25 to .30
Welding circles	.75 to 1.00

Our other prices are proportionately the same.

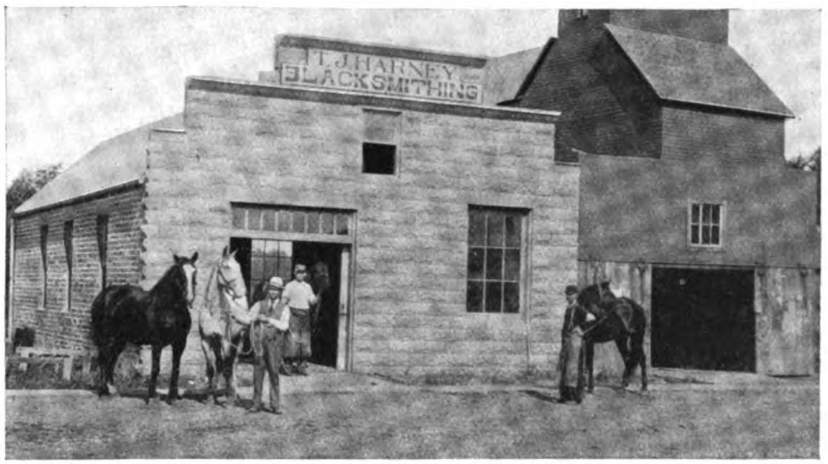
The Use of Alcohol and Gasoline in Gas Engines—5.

C. E. LUCKE AND A. M. WOODWARD.

Limits of Proportion.

When the air and vapor are mixed in just the proportion known to be chemically correct the mixture is explosive. If it contains a little more fuel than the air present will burn it may still be explosive, but much excess of fuel will cause it to cease being explosive. There is thus a high limit to the explosive proportions. Similarly, if there is present a little more air than is necessary to burn the vapor the mixture will be explosive, but much excess of air will make it nonexplosive; and, therefore, there is a low limit to the proportions for explosive combustion. If to any explosive mixture there is added some inactive gas, such as nitrogen, carbonic acid gas, steam, or the products of combustion of a previous explosion, the mixture will not burn so well as without this neutral addition. If there is much neutral added, it will be found

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CEMENT BLOCKS ARE EXCEPTIONALLY WELL SUITED FOR SMITH SHOPS

that the mixture is no longer explosive, although the proportions of air to vapor are quite right chemically. Thus there is a third limit by neutral dilution. Therefore, for a mixture to be explosive it must contain air and vapor, though not too much air, gas, or neutral. A mixture which by reason of its proportions is beyond the range of explosive combustion may be rendered explosive by compressing it without in any way changing the proportions of air to gas or the amount of neutral present, and the more it is compressed the more rapid will this self-propagated combustion be. Temperature has a similar effect on the limiting proportions.

Temperature of Ignition.

By careful experimenting in scientific laboratories it has been found that explosive mixtures of different fuels do not all ignite at the same temperature; that some, for instance, must be heated to a higher temperature than others to start combustion. It has been found also that the temperature of ignition is lower for any given fuel when there is just a little excess of fuel in the mixture. If the mixture contain much excess of fuel, it must be heated to a higher temperature before ignition can be started. The temperature of ignition for any mixture will not be raised by adding inactive gas or by changing properties, but it may take a longer time to ignite when weak.

It has been found that raising the pressure or raising the temperature of the mass before attempting to ignite it will cause it to apparently ignite more easily. The time necessary to start ignition is lessened if the mixture be confined so that it cannot circulate. It appears that a mass of mixture being heated at one point in an attempt to ignite it acts very much like the air in a room when the room contains a radiator for heating. The mixture near the radiator rises before becoming very hot, and it takes some time before any part of the mixture can be raised to the temperature sufficient to ignite it unless the circulation be suppressed. While no exact figures are available for the temperature of ignition for the mixtures used in these exploding liquid fuel engines they can be placed in the following order:

Kerosene mixtures have the lowest temperature of ignition.

Gasoline comes next, but is quite close to kerosene.

Alcohol mixtures have the highest temperature of ignition and are quite far removed from kerosene and gasoline.

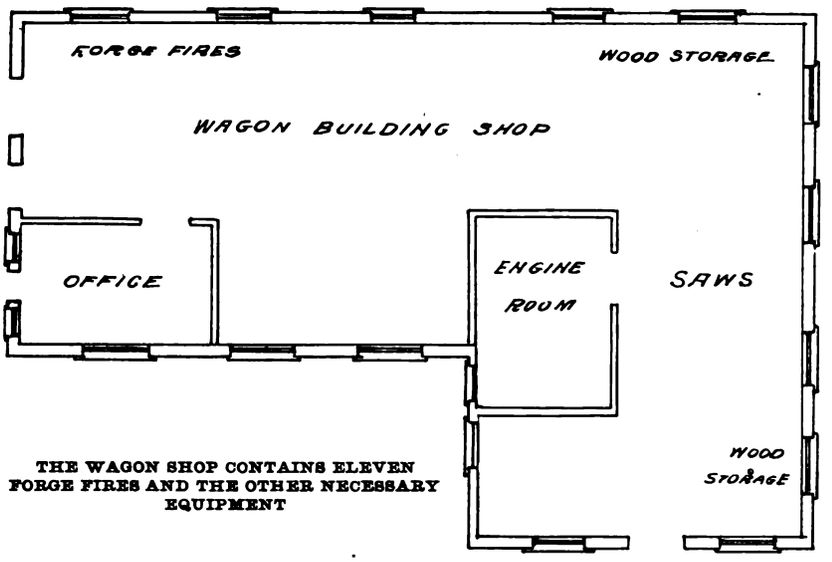
Rate of Propagation.

The velocity with which the flame cap travels through the mass of mixture is termed the "rate of propagation," and this is sometimes very high, and sometimes very low. Mixtures containing a certain small excess of fuel over what seems to be chemically correct burn faster than any other mixtures of that fuel. With much excess of fuel, much excess of air, or much neutral gas, the rate of propagation becomes lower, so that mixtures burn slower the further they depart from the proper chemical proportions (with the exception noted), or the more inactive or neutral gas they contain. The nature of the fuel has an influence on the rate of propagation, and for our purpose it is only necessary to cite kerosene, gasoline, and alcohol mixtures. Kerosene mixtures burn fastest, and so have the higher rate of propagation. Next come gasoline mixtures and lastly alcohol, with the lowest rate of propagation, assuming, of course, always the correct mixtures in each case. The higher the pressure of the mixture before ignition the faster it will burn, so that the rate of propagation depends upon the pressure. Similarly, the hotter the mixture when ignited the faster it will burn, so that increase of temperature makes it burn faster or raises the rate of propagation. The shape of the chamber containing the mixture has a very decided effect on the rate of propagation. It was found by observing mixtures burning in glass tubes that, when very small tubes were used, the rate of propagation became perceptibly retarded, and when extremely small tubes were used the rate of propagation was zero; that is to say, the tube can be made so small that the flame will not propagate itself through the tube at all. This is because with very small tubes the heat can be conducted away from the flame faster than the flame liberates it, with the effect that combustion ceases simply by cooling, just as water quenches a fire. If, in a tube so small



A BLACKSMITH AND MACHINE SHOP IN OKLAHOMA STATE

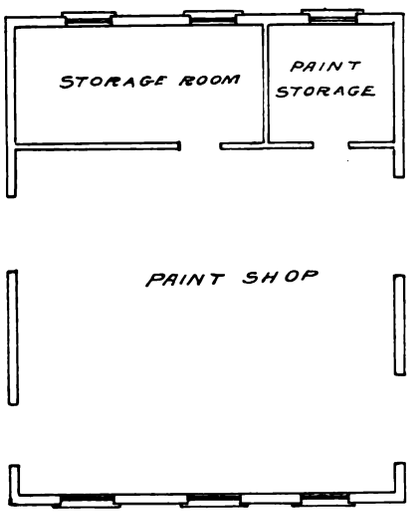
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THE WAGON SHOP CONTAINS ELEVEN FORGE FIRES AND THE OTHER NECESSARY EQUIPMENT

as to prevent propagation, the mixture be compressed, it will liberate heat faster by reason of its greater density, and self-propagation will then be possible. It appears, then, that affecting this rate of propagation there is a whole series of influences, some tending to make it less, others more, with the consequent result of making it difficult to predict what will happen in a new case. A knowledge, however, of these causes of increase and decrease is essential in the interpretation of engine results, because the rate at which pressure rises in the cylinder after explosion depends upon the relation between the rate of propagation in the mixture and the piston speed of the engine. The motion of the piston outward tends to lower the pressure, while combustion by self-propagation tends to raise it. If the piston speed be small in proportion to the rate of propagation the pressure will rise in the cylinder rapidly. If, however, the piston speed be great and the rate of propagation small, the pressure may not rise at all in the cylinder or it may even fall during the explosion.

Aside from the mere question of average velocity of propagation, there is another question of great importance, and that is the mode of propagation. It has been shown by the work of the French scientists that there are three modes of propagation, or that the wave cap travels through the mass in three ways, each producing different effects, and all of them influencing the performance of an engine. If the mass be free to expand while burning, the flame will communicate its heat to the next layer of mixtures and so ignite it. Thus by successive heatings of layers the flame would propagate "uniformly." The expansion of the burnt gas, however, if explosion takes place in a chamber confining the mixture, under the influence of the heat generated by the combustion, seems to start a pres-



THE PAINT SHOP IS UNDER A SEPARATE ROOF AND AWAY FROM THE WAGON SHOP

sure wave through the mass similar to a sound wave, and the flame cap can be seen to oscillate in its advance. This is said to be an "undulatory" movement, which is the second mode of propagation. If by any series of circumstances a number of waves of this kind should be set up in the mixture so that the crest of one wave matched the hollows of another, the waves would be eliminated. If, on the contrary, the crests of the first be superimposed on the crests of the second, third, etc., the waves would be synchronized, and produce momentary high pressure, localized at the point representing the wave crest, thus giving rise to the third mode of propagation, the explosive wave. In any case a wave in the mass that may synchronize with waves of combustion will exaggerate the possibility of producing the explosive wave. Agitation of the mass, such as is produced by a jet impinging into the main mass, will do this, and so will a wave of piston compression. This is a matter of very considerable importance in engines, for, if the exhaust chamber be not of the right form, there may be pockets or isolated masses of mixture so placed that ignition starting in one will raise the pressure in that, causing a flow of gases toward the other with a corresponding agitation and synchronizing of waves resulting in the explosive wave. An explosive wave gives rise to pressures in this way very much in excess of the pressure due merely to the heat liberated, reaching 600 pounds per square inch in the engine cylinder. If the ignition be early, that is to say, if ignition be started while the piston is still compressing gas, there will invariably result similar explosive waves, straining the engine without any useful effect.

Pressure Due to Explosion.

The pressure after exploding the charge will depend upon the amount of heat liberated and upon the weight of gas present. The amount of heat



A FRONT VIEW OF A SOUTH AFRICAN WAGON SHOP

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liberated by the explosion of the mixture of vapor and air will depend upon what fuel it is, whether kerosene, gasoline, or alcohol; the proportions of vapor to air; the amount of burnt gases left in the clearance, and the extent to which the charge has been heated on entering the cylinder during the suction stroke, and, finally, upon the compression pressure before ignition. It is easy to calculate this temperature rise on assumed values for these conditions, but it is just as easy to prove these assumptions wrong, so that computations of this kind are of no great value. Designers, must, however, design an engine to resist these pressures, and so must have experimental values of this pressure. They are also valuable to experimenters in interpreting the performance of the engine by comparing the highest pressure observed in some case with the normal. If the normally high pressure is not attained, it has been due to an improper point of ignition, a loss in charge, or a weak mixture. The experimenter can also distinguish between normal pressure due to the heat liberated, and abnormal ones due to explosive waves, which are destructive to the engine bearings and metal parts, but not useful for producing work.

(To be continued.)

A Large Wagon Shop of South Africa.

W. W. WATT.

The accompanying engravings show two exterior views and also plans of Merryweather's wagon shops here in Natal. The wagon shops are 250 feet long by 100 feet on one street, and 150 feet by 145 feet on the other. The paint shop which is across the street from the wagon shops is 54 feet by 60 feet. We have eleven forge fires in the shop, and are otherwise thoroughly well equipped. We have a steam hammer, a power hammer, a bending machine, a heavy punching and shearing machine, three drill presses, an emery stone, a grindstone, a heavy screw-cutting lathe and a heavy power-driven tire-setting machine. Then there are the wood-working machines; saws of various sizes, a boring and morticing machine, a spoke-turning and tenoning machine, a band saw and a machine for turning built wheels. The forges are all driven by a large fan. The tire-setting machine is a great labor saver, and with it we set tires up to six inches broad, and with ease.

In the engraving showing two wagons the rear one is a spring wagon with front and back-acting brake. This wagon when photographed was just about to be taken to the annual show held here, where it was awarded silver medal for excellence.

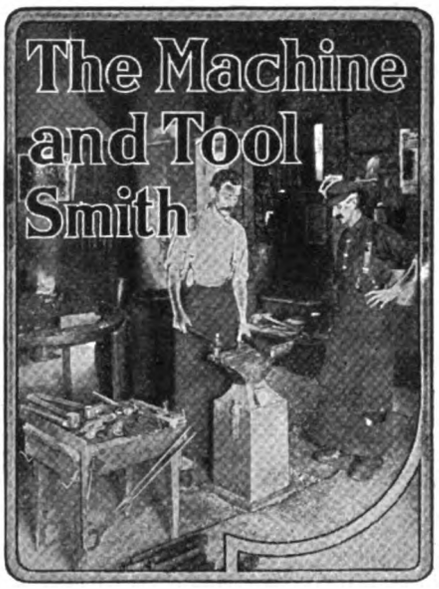
The firm of Merryweather and Sons have a great reputation for good workmanship. They are an old established firm, the founder having died about eighteen months ago.

The paint shop will accommodate four rows of wagons. The storage room in this shop is for axles, springs, and other fittings which mostly all imported. The paints and oils are kept in a separate store.

The paint shop being across the street from the forge shop and under another roof gives the painters an exceptionally clean airy place for their work and insures a good job as far as atmospheric conditions go. This, in many cases, is half the battle for a perfectly surfaced vehicle. Given materials of the proper quality, competent wielders of the bristles will turn out as finely surfaced vehicles as it is possible to produce. But the best of painters, with the best of materials, cannot turn out good work in a smoke-filled, soot-laden atmosphere.



AN EXTERIOR VIEW OF THE PAINT SHOP SHOWING TWO FINISHED VEHICLES



The temper heating of steel should be slow. The slower it is the better the heat is distributed through the steel and the tougher it becomes. As soon as the desired temper color appears it is fixed by immediately quenching in water. If it is allowed to cool slowly, the next following color will appear and the steel will turn out softer than wanted. E. F. GARBER, Ohio.

A welding powder that is excellent for iron or steel is made as follows: Powder finely six pounds of borax, four pounds of yellow prussiate of potash and mix thoroughly. Now make a paste with this mixture and water and boil till the mass is stiff. Then let it harden over the fire. Now grind it up and mix it with two pounds of clean, rust-free, wrought-iron filings. Use same as borax or other welding powder. G. A. STEVENS, New Jersey.

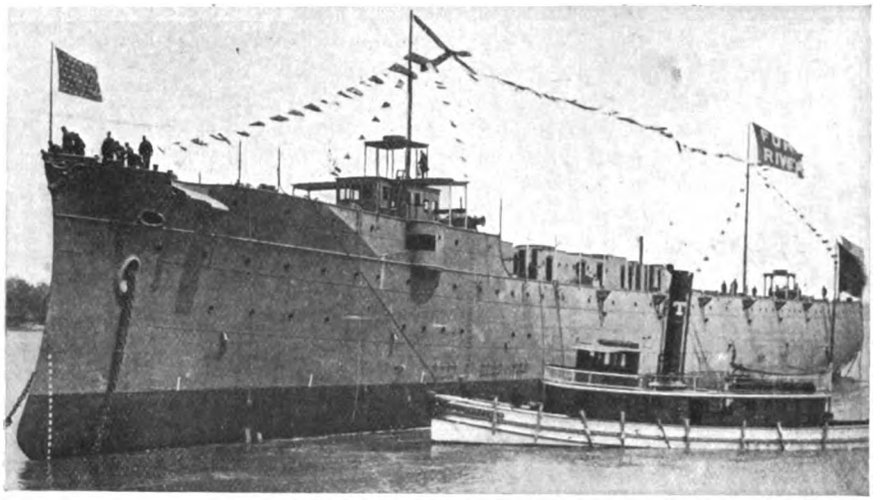
The best steel for a given purpose is not always the hardest, as many suppose. The best steel for any purpose is that which is most suited for the particular use to be made of it. Very hard, fine grained steel for instance is unsuitable for sledge-hammers, nor is a very good steel for springs well fitted for turning in the lathe. It is, therefore, most important to secure such a grade and brand of steel as is best suited to your particular use. A. G. R., Georgia.

Portable Deck Stanchions.

C. H. RICHARDSON.

The launching of the U. S. Scout Cruiser *Birmingham*, at the Fore River Ship & Engine Works, Quincy, Mass., on May 29, brought to my notice a subject that is interesting to all shipworkers, and that is stanchion building. This work as a rule is given out on contract in most shops. Engravings 2 and 3 show two of the piece work fires at the works and their

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THE U. S. SCOUT CRUISER "BIRMINGHAM." LAUNCHED MAY 29, 1907

branches of this kind of work. The fire in engraving No. 2 is to forge the two solid ends of the stanchion and weld them into the pipe that forms the center of the upright. The ends are forged about three inches longer than the taper shows. This extra length is to allow for welding. These parallel ends are swaged down, leaving a sharp shoulder just at the beginning of the taper; the reduced ends being left ¼ inch larger than the inside diameter of the pipe. The ends of the pipe are pened out so the solid forging will just drive in the cold pipe. A welding heat is taken on the solid end and the work driven in place. The stanchion is now laid in the fire for the first heat, the work is then taken to the steam hammer and with a few blows welded solid. A V-shaped block is used for the work instead of the common swedge block. It may seem strange to hear of 2¼-inch pipe being welded under a ten-pound Morgan hammer, but it is true, nevertheless. The bright-faced boy in engraving No. 2 operates this hammer and the smith on this work tells me he has missed very few heats since he has adopted the hammer and V-shaped block plan. His average per day has been three finished stanchions. The wire eye at the top and the square socket end on the bottom are forged in dies, leaving only the fins to be cut away and swaged over. Engraving No. 3 shows one of the band fires. Charlie Johnson is the operator of this fire and he made all of the hook-eye bands for this order. There were 600 in all, and he turned out an average of eight finished forgings per day.



FIG. 2—THE TWO SOLID ENDS ARE WELDED INTO THE PIPE



FIG. 3—SIX HUNDRED HOOK-EYE BANDS WITH AN AVERAGE OF EIGHT FINISHED FORGINGS PER DAY

In Fig. 4 is shown a good view of the stanchion in place. This upright represents a section post and forms the division of the rail. On this upright are the two-eye bands with eyes wired—rounded. The netting and cables are fastened with sister hooks and shackles to these eyes. In this engraving, notice the brass casting at the lower end of the stanchion. This device not only acts as a stiffener for the upright, but works as a swivel when it is desired to clear deck for action. A man is stationed at each one of these uprights and at a given signal the stanchion is raised out of the square socket, the swivel comes into action and the whole division falls level with the deck.

It seems almost wonderful when one thinks of the hundreds of square feet of heavy canvas that will cover these decks, not counting the miles of wire cable that will be used for guard railing and lashing, to make all these canopies firm, when with one order of two words ("Clear Decks") the whole mass is stored below, and all this work requires but twenty minutes or less.



THE FINISHED STANCHION ATTACHED TO THE DECK

A Good One on the Engineer.

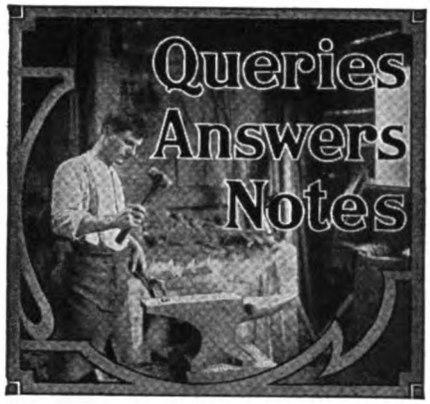
OSCAR WILLIAMS.

The apprentice was occupying the remaining minutes of his lunch hour by looking over the engine. After watching him for a few minutes, the man who has charge of the engine, said: "Well! Do you think you can run her?"

The boy looked up for a moment, settled himself into an easy pose and apparently in a careless manner let his hand rest on the crank shaft—'twas only for the fraction of a second, though, for he jerked his hand away quick as the proverbial lightening and began blowing on it as though it was burnt.

The "acting engineer" dropped his cup of coffee and the dinner resting on his knees, and with oil can and wrench rushed at the apparently heated shaft. By the time he reached it and found it cold as ice, the grinning apprentice was at the filing bench, for the whistle had blown.

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The following columns are intended for the convenience of all readers for discussions upon blacksmithing, horseshoeing, carriage building and allied topics. Questions, answers and comments are solicited and are always acceptable. Names omitted and addresses supplied upon request.

Wants the Horse to Trot.—Will some brother smith kindly tell me how to shoe a horse to make him trot? I also want to know how to shoe for pacing. The animal is a natural pacer. D. E. G., Australia.

Wants to Know How.—Sometime ago, I think it was in the May paper, Brother W. A. M. promised to tell us "how to fill a rubber-tire wheel without removing the tire." Will W. A. M. kindly "come in" with the promised article? I am very anxious to know how he does it, and I'll wager other smiths are just as anxious as I am. ART. F., Connecticut.

To Soften Castings for Drilling.—In answer to the question in the July number on how to soften castings for drilling, would say mark the place where hole is wanted, heat to red heat, then place a piece of brimstone, about the size of hole wanted, on the mark and hold level till the brimstone is burned. Let cool without water and then drill. W. J. HANAN, Missouri.

A Roller Disk Sharpener.—Brother J. B. Hall, of Washington, asks in the July paper where and by whom a roller disk sharpener is made. In reply I would say that Skow's Rotary Disk Sharpener is manufactured at Newton, Iowa, and is the style of machine he desires. There is also another roller disk sharpener called Toliver's Roller Disk Sharpener, but I am unable to give the address. WM. WINKLE, Kansas.

A Good Gasoline Engine.—In the May number of THE AMERICAN BLACKSMITH I noticed that Brother E. S. Fish wants to know what is the best make of gasoline engine for the blacksmith. For the past two years I have been studying this business and after looking at several engines, I decided to buy a Waterloo Vapor Cooled. I ordered one of these machines, a 4 H. P., on 30 days' trial, and I think it is far ahead of any water-cooled engine I have ever seen. JOHN W. RUSSELL, Pennsylvania.

Drilling Chilled Castings.—Let Brother E. W. J., of Kentucky, use a saturate solution of spirits of turpentine and oxalic acid for a bath on his drill, keeping the drill point constantly wet with same, and feeding slowly, and he will not need to draw the temper out of anything he wants to drill, as this, to my knowledge, will drill glass and chilled casting. If he must draw the temper he can do so by burning sulphur on the point he wants to soften and drill. J. T. LAVEIGNE, Florida.

To Harden Engravers' Tools.—I like THE AMERICAN BLACKSMITH above all other papers. I found a receipt in it for soldering aluminum that I think is worth more than the year's subscription price. I have a receipt that may be of some value to some of the readers. To harden tools for engraving, heat the steel to a white heat and dip into sealing wax. Then take out and repeat until steel is cold. The result will be a tool point that is almost as hard as a diamond. ORLO MCSWAIN, Wyoming.

Publishing Price Lists.—In reply to your request for the opinions of different smiths in regard to publishing price lists, I will say I do not see what benefit catalogue houses or anyone else can derive from it to hurt the craft. Only in a few cases where the prices are lower than they should be. In such cases people might say if they can do work for such a price in such a place, why can't you? As for my part, I am pleased to have them printed, as in that way I am kept informed of what others are doing all over the country. It had considerable to do with our raise in prices here this spring. WM. H. KELLEY, Vermont.

For Browning Iron and Steel.—The article is first thoroughly cleaned of all dirt and grease. This is best accomplished by means of a soda bath or muriatic or nitric acid may be used. After thoroughly cleaning the article, dry and coat with ammonia. After coating allow to dry in a warm place and then give the metal a coat of either muriatic or nitric acid. After again drying in a warm place the article is placed in a solution of tannin or gallic acid and again dried as before. The color is now deepened, if necessary, by placing it near the fire. Care, however, is necessary so as to withdraw it immediately the desired shade is produced. The article may be colored black if held before the fire long enough. E. F. WOODS, New York.

A Price List from Kentucky.—The following is a bill for repairing a milk wagon which recently came into our shop:

Painting	$18.00
New set steel tires	12.00
11 new spokes	3.85
Set of new rims	8.00
New set axles	15.00
7 feet gold leaf lettering	3.15
New dashwood panel	2.00
New back panel	1.00
New floor inside bed	2.00
New fifth wheel	2.50
New shaft clips and eyes	3.50
Cover top, new	3.00
New singletree hooks	.50
Repair king bolt and guard iron	1.00
18 new bolts	1.80
New front axle bed	1.75
2 new axle clips	.75

The wagon is a light, one-horse, three-spring milk wagon. J. G., Kentucky.

California General Prices.—I have been reading THE AMERICAN BLACKSMITH for one year and think it a grand journal. I would not be without it now for a great deal. I have never seen an item in your journal from my section of the country, and perhaps some of our prices would be interesting.

4 new shoes	$ 2.00
4 old shoes	1.50
Setting tires, each	1.00
New tires from	$12.50 to 15.00
Stubbing buggy axles	$10.00 to $12.50
Point'g and sharp'g plows	1.00 to 1.25
Rimming buggy wheels, each	2.00
New spoke	.25 to .50
Tongues	5.00 to 7.50
New shafts old iron	5.00

And other prices in proportion. These prices may seem high to eastern brothers, but stock is higher here and price cutters we don't know. JOHN H. WRIGHT, California.

A Well Equipped General Shop. We do a general blacksmith and machine business, also carry a good big line of buggies and wagons. We have in our shop the best set of tools in this section of the state, consisting of a 6 H. P. gasoline engine, a 19-inch swing 12-foot bed engine lathe, a bandsaw, a shears, a disc and harrow sharpener, an emery wheel, a drill, a rubber tire machine, a tire bolter, two Root blowers, and a McGovern power tire-setter. We would not stay in the business thirty minutes if we had to do without power. We are strong believers in all kinds of good advertising and use circulars and newspaper advertising freely. We do some credit business, but try to hold the "dead beats" down and we lose but very little by crediting, while we gain a great deal. We do not think a strictly cash business is possible to the greatest gain. J. F. SHEPHERD, Indiana.

From Gasoline to Kerosene.—My Fairbanks-Morse gas engine is a four Horse-Power vertical. Gasoline is hard to get at times so I use kerosene oil now. I take a common oil cup and put it on the engine just above the air suction by the side of the needle feed (not close to the needle), fill cup with gasoline and loosen enough to let the oil drip. I then start the engine as before, turning on kerosene a little more than if using gasoline in tank. Kerosene will not explode until the engine has reached its normal speed, and then when warmed will give good satisfaction. The little gasoline that was in the bottom of tank did not seem to do any injury. The warmer the engine gets the better it works. I don't know how it will work in cold weather, but gasoline can be used then. There is another way to use kerosene; use two tanks, start on gasoline and then have a switch back of pump to change after engine starts. E. D. MASTIN, Nebraska.

Another on Publishing Price Lists.—Mr. A. J. Yeager says he has been watching "Our Journal" for a long time, and he is not alone watching, for I see all there is in it. Now it may be all right to publish price lists, but I think it gives the "Jackleg" our prices, and then he just drops under enough to hurt if he can, and he hurts, no doubt, to some extent. Don't you think it proper to keep our prices secret, and if a brother smith wants our price let him send to you or direct to the smith from whom he may want the price? See how the manufacturers keep their prices from us, so as to shield the jobber. It would be my plan to keep our prices from all but our customers and a brother smith when they are wanted. We give our prices too much publicity. When a brother sends in a letter with prices keep it for reference. A jobber who does not keep his trade for the smith only and sells to anybody should not have our trade. Trade for spot cash and be independent, Brother. Yours for the betterment of the trade. A. S. PRIMMER, Missouri.

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An Upsetting Kink.—Most of us "Old Back Numbers" feel that we are better with a hammer than we are with a pen. I know this to be the case with me. My education is limited, but I can talk equal to the occasion. Every little while I talk with some young fellow who is working at the trade and tell him how we used to make all kinds of work forty years ago. Some will hardly believe it. I remember one young man who was setting buggy tires; he was having a hard time of it; the holes all come wrong and things did not go right at all, so I asked him where he upset his tire and he said, "Anywhere it happens to come into the fire." Then I marked a very loose one in the loose spot and told him to upset that one where it was marked. I came back past the shop after a little while and he says, "Uncle, come in here and tell me where to upset this tire." We had a nice visit and he enjoys having me come in and see him when in the town where he works. He often said that the advice in regard to tire setting did him more good than any other simple kink he ever learned. OLD TIMER, Michigan.

The Correct Solution of the Measuring Problem.—Let me say to Brother Watt, of South Africa (Page 230, July), that his trouble in measuring the wheel with a traveler was due to the grain on the wood being "rucked up" by the tool, thus giving it the appearance under the microscope of a pile of velvet. The wooden pile, however, leaned one way, away from the operator as he faced the wheel in the lathe. When he measured the wheel from the side he turned it the wheel revolved toward the traveler, which pushed the pile down. When he ran the wheel from the opposite direction the traveler pushed the pile upward from the angling position in which the lathe tool left them. A wheel so lathed will travel 3/16-inch or slightly more (very slightly), for each one foot of diameter, and the correct measurement for a tire to fit same and have sufficient draw is to take the two measurements and divide the difference by two, adding the sum so obtained to the smallest measure for your measure after welding and cooling. He will find this exact. J. T. LAVEIGNE, Florida.

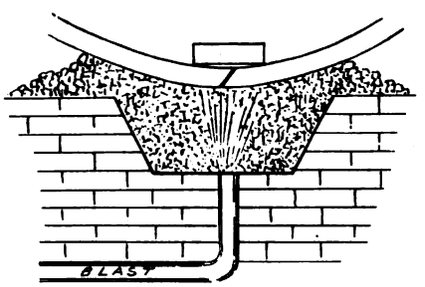
A North Carolina Power Shop.—I cannot get along without THE AMERICAN BLACKSMITH. The paper is a boon to the craft. I am still in the smithing business. I own an acre lot with a wood shop, 32 by 37 feet, floored and ceiled overhead, with a smith shop, 18 by 25 feet, adjoining. On March the 4th, 1907, I installed a three-horse I. H. C. gasoline engine for my power. I have two rip saws, 12-inch and 18-inch, and one 12-inch hand jointer. I have under construction a wood shaper, that will be completed in a short time. I have one good helper and do all kinds of repair work and have plenty of it. My engine brings more work, and now the engine, myself, and helper are busy all the time. I am making my machines as fast as I can have the time. I also have a leaver-feed drill for hand or power. When I get my shop and tools all completed I will send a photo of my shop; some time later I will give to the readers of THE AMERICAN BLACKSMITH a full description of all my machines and how to make them and how I manage my business. I cannot now, as time is precious. J C. ALLRED, North Carolina.

A North Pacific Coast Price List.—I am so glad to see so many of the brother smiths giving their prices on their work, but do not think they are getting enough. I will give you here some of our western prices that we think we are too cheap:

Shoeing "Never slip," per span	$7.00 to $ 7.50
Common shoes, per span	4.00 to 4.50
Resetting, per span	2.00
Plow lays	4.00 to 4.50
Points	1.00
Sharpening	.35
Setting buggy tires	4.00
Wagon tires 1¾ tread	3.50
Wagon tongues	4.00
Hounds, front	4.00
Hind hounds	3.50
Tongue hounds	3.00
Axles	5.00
Bolsters	3.50
Cutting down wagon	14.00
New buggy pole complete	7.50
Wagon and buggy spokes, each	.40
Felloes, each	.50

All other prices in proportion. May be these prices will interest my eastern brothers. E. M. DUNN, Washington.

Ringbone and Spavin.—In reply to Brother Breitenstein, of Washington, I would say that proper shoeing should first be tried in an effort to treat the ringbone. This is done by straightening the axis of the foot, i. e., making the wall of the foot from the coronet to the toe continuous with the line formed by the front of the pastern. If inflammation remains in the ligaments a sharp blister of biniodide of mercury and cantharides may be applied if the animal is allowed to rest for four or five weeks. If the above fails, firing in two or three lines over the ringbone may be tried. It is necessary to touch the iron well into the bone, as superficial touches will do little good.



AN AUSTRALIAN RECOMMENDS A HOT BRICK

For treating the spavin I would recommend a start being made by resting the animal absolutely; a month or more is not too much. Cut the hair from the part affected and apply the following mixture to the lumps: 2 ounces of cantharides, 4 ounces of mercurial ointment, 4 ounces of turpentine, 3 ounces of tincture of iodine, 3 drachms of corrosive sublimate. Mix these thoroughly with two pounds of lard and rub it well into the lumps with the hand. After two days rub the lumps with plain lard and in four days wash the parts with soap and water and apply the ointment again. Repeat this every four days. A. F. BURNS, New York.

An Argument on Setting Axles.—As I am a new subscriber to "Our Journal," I would like to say, first, that I like it very much and have gotten lots of good information out of it. I have been working at the trade about five years and in the place where I work two smiths have had some argument as to setting axles. The one said that all axles should have about three-eighths of an inch gather, that is, three-eighths of an inch narrower in front than behind, measuring the outside of the wheels. The other said that Concord axles should have more gather than half patent or long distance axles, because they had more taper, claiming that the front of all axles should have straight bearing in front; that is, if you take a straight edge and hold it on the front side of the axle, the point and the butt next to the collar would both touch the straight edge. Would some brother smith who knows please give an explanation of this and say which is right, answering through the columns of THE AMERICAN BLACKSMITH?

Here is something that may be of good use to some brother smiths: If you have a thread cutter that you cannot tighten when the dies get worn and the nut goes on too hard, take a little piece of tin and put it on the tap and run it through the nut and you will find that it now goes on very easily. The looseness can be regulated by putting thick or thin tin in between the tap and nut.

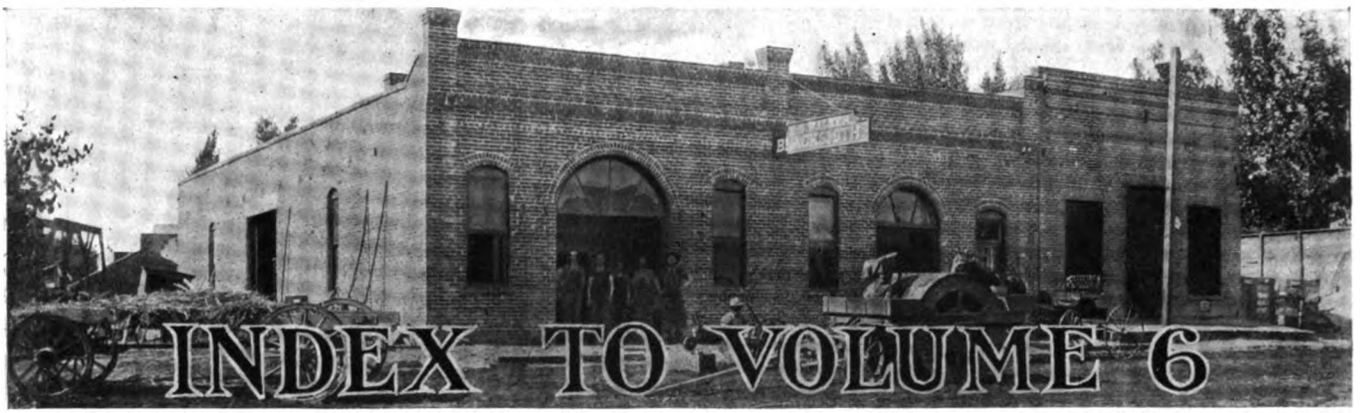
N. E. KOCH, 1135 Court St., Los Angeles, Cal.

Welding Wide Tires.—In the recent numbers of THE AMERICAN BLACKSMITH I notice especially the articles on welding wide tires. I might not have troubled you had not a Mr. Neidermeyer, from Australia, asked advice. I will assume that Brother Neidermeyer hails from C. Q., a place that produces first rate steam coal, but that is altogether unsuited for smith work, hence his difficulty in welding his tires solid. I have many times been surprised during my experience to find so few smiths who did not know how to use that old method, "The Fire Brick." I would give two methods to prepare the fire. First: Take a piece of wood about the width of the tire to be welded, about three inches thick and any convenient length, and place this on end narrow edge against tuyere iron, pack around this damp coal, but not too wet. Now withdraw the piece of wood and fill up the space with well-lighted coal or coke, scarf tire in the usual way and place on fire. Put a piece of fire brick of sufficient size to cover right across. If your coal is good, cover right over, use no sand. If the edges get too hot, hold a thin piece of cold, flat, iron, say 1½ by ¼-inch, alongside for a few seconds. When looking at the heat do not let any coal or coke get between the brick and the tire.

Second: Prepare fire as before and place tire in position. Now have two bricks, one in a spare fire while the other is on the job. Heat the one in the spare fire as hot as possible on one side. Keep changing the bricks until the required heat is obtained. Allow nothing but the brick on top of the weld while heating. Some time ago I had to make a band six feet in diameter, nine inches wide and five-eighths inch thick for a cracked bridge cylinder, and I got a splendid job by this last method. Of course, it's hardly possible to finish off a job so wide in one heat, but if the center is thoroughly welded, edge heats can be taken to finish off. J. F. W., Australia.

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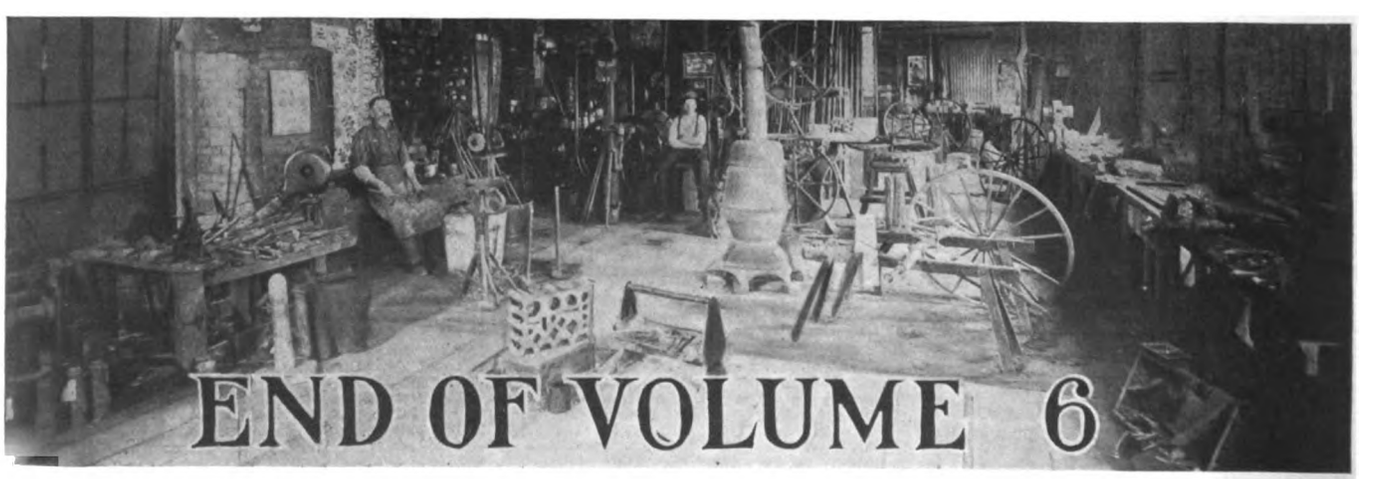
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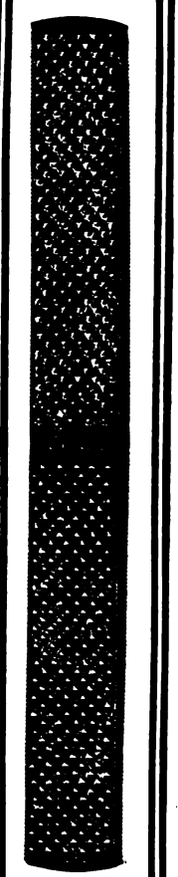
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Prices Current — Blacksmith Supplies.

The following quotations are from dealers' stock, Buffalo, N. Y., Sept. 1, 1907, and are subject to change. No changes have taken place since last month's quotations.

All prices, except on the bolts, are per hundred pounds. On bars and flats prices are in bundle lots.

Bars—Common Iron and Soft Steel.

¼ in..	round or square;	Iron,	$2.95	Steel,	$2.95
⅜ in.,	"	"	2.55	"	2.40
½ in.,	"	"	2.35	"	2.20

Flats—Bar and Band.

¼ x 1 in.,	Iron	$2.40;	Steel	$2.40
¼ x 1½ in.,	"	2.30;	"	2.30
8-16 x 1½ in.,	"	2.50;	"	2.50

Norway and Swedish Iron.

¼ in., round or square	$4.90
⅜ in., " "	4.50
½ in., " "	4.30
¼ x 1 in	4.30
¼ x 1½ in	4.20

Horseshoe Iron.

For No. 1 shoe, ⅝ x ½ in	$2.50
For No. 2 shoe, ½ x ⅝ in	2.50
For No. 3 shoe, ⅝ x ⅝ in	2.50
For No. 4 shoe, ⅝ x ⅝ in	2.50

Toe Calk Steel.

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¼ x 2 in	$0.54	⅝x2½ in	$0.82
¼ x 2½in	.58	⅝x3½ in	.96
¼ x in	.62	⅝x6 in	1.31
5-16x 2 in	.65	½x4 in	1.70
5-16x 3 in	.75	½x6 in	2.10

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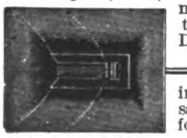
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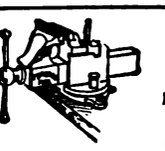
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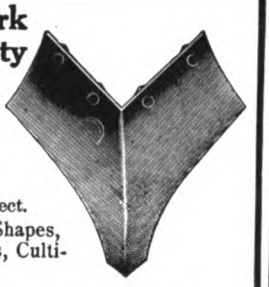
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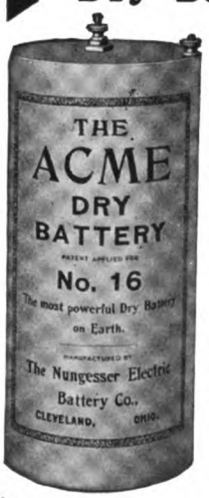
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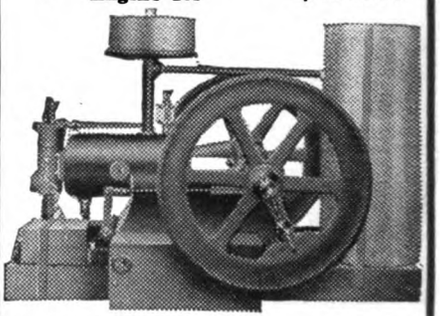
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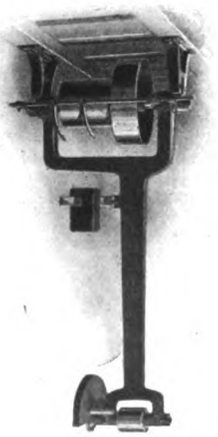
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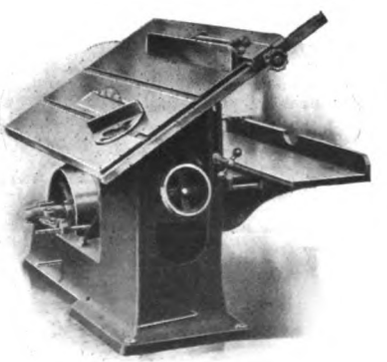
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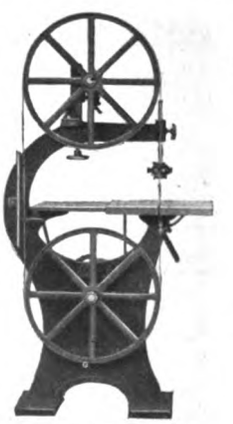
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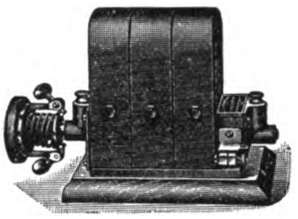
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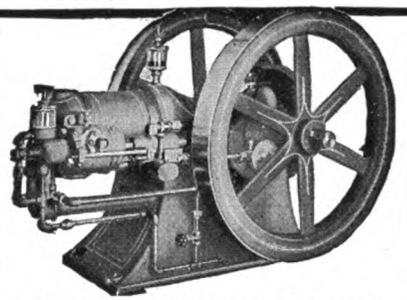
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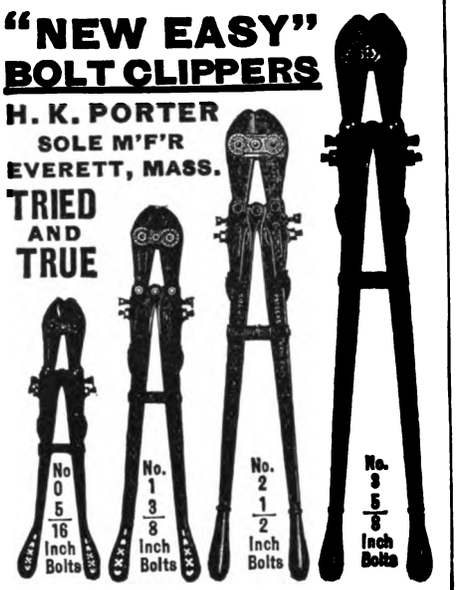
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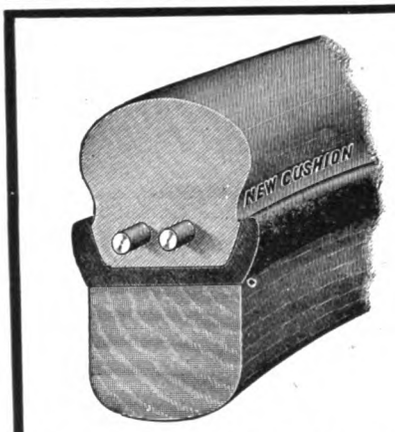
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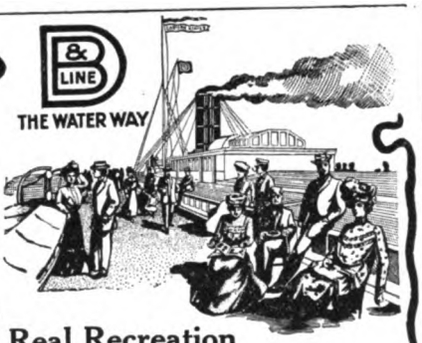
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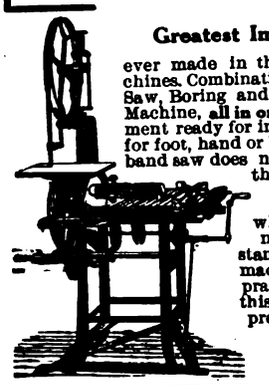
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for all time is the....

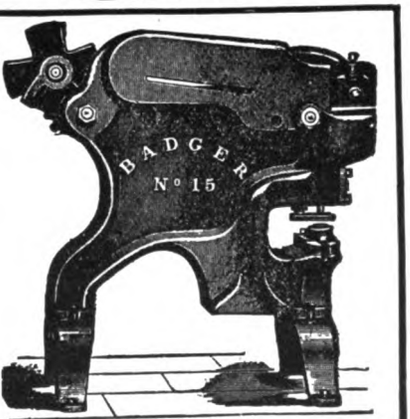
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We make them in all sizes and varieties, **TO FIT ANY AXLE.** Any height, any width of tire you may want. Our wheels are either direct or stagger spoke. Can **FIT YOUR WAGON,** Perfectly without change....

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Here is a Punch and Shear that will punch and shear just as we say with

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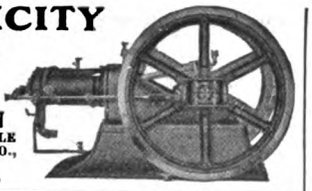
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Shear 4 x ½ in. Flat Iron
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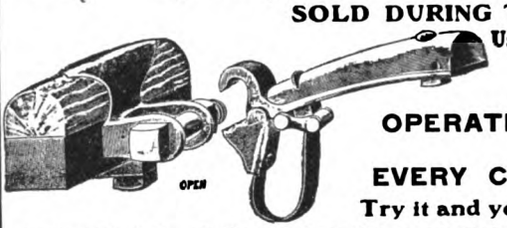
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Special Net Price on Sarven Patent Wheels (C. B. 50c. extra) with steel and rubber tire

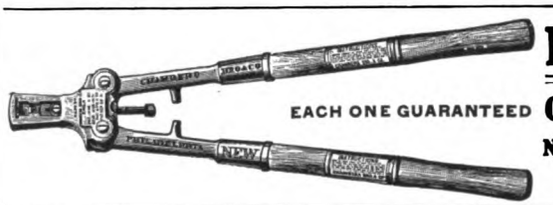
Size of tread	Price per set for wheels with flat steel tire on and hubs bored	Price per set for wheels complete with channel and rubber tire on, and hubs bored. 36 and 40	38 and 40	40 and 44	Add to price of wheels for axles and boxes set
3/4	$6.25	$13.20	$13.40	$13.60	$1.90 L.D.
7/8	6.50	14.50	14.80	15.10	1.90 "
1	6.75	16.00	16.30	16.60	2.10 "
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Send for our new catalog containing over 400 devices used by the carriage trade,

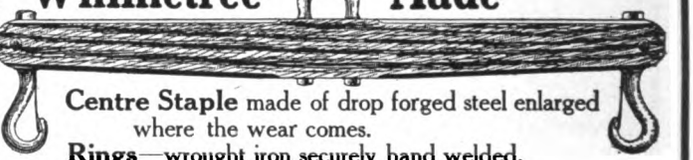


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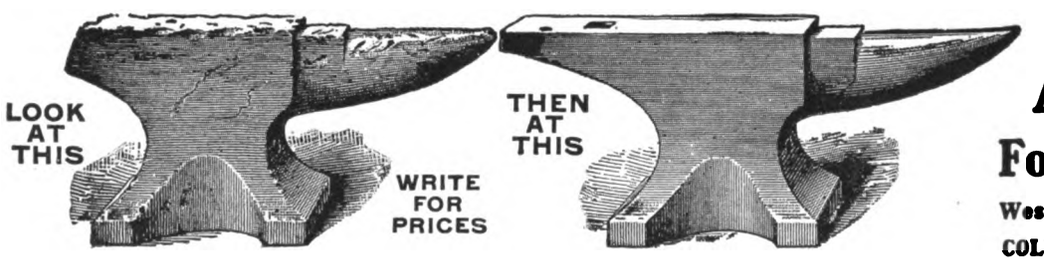
Strongest Whiffletree Made
With Patent Spring Hooks





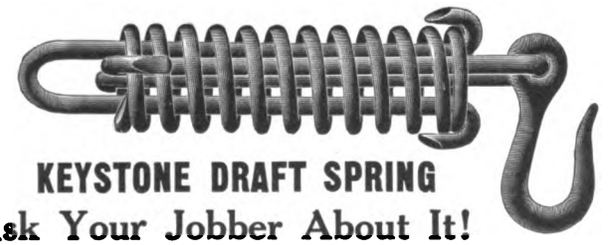
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Rings—wrought iron securely hand welded.
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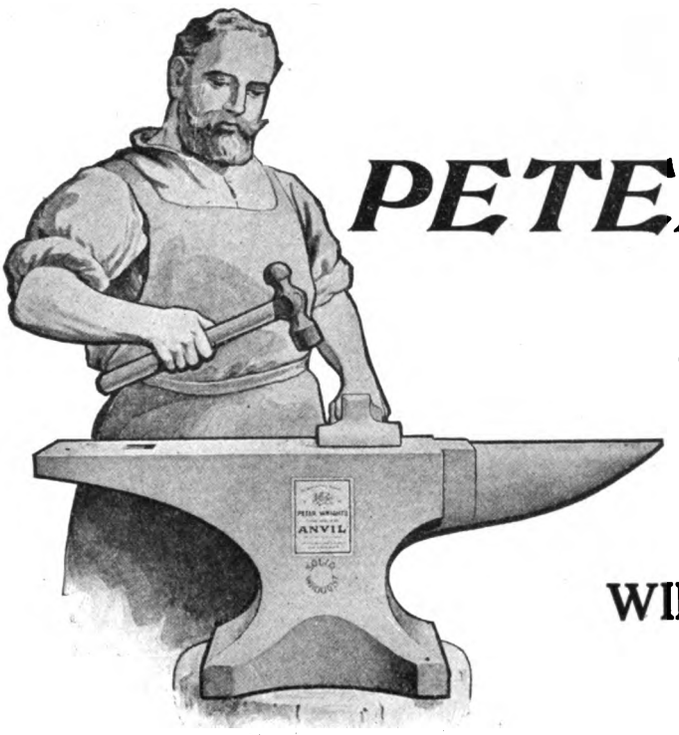


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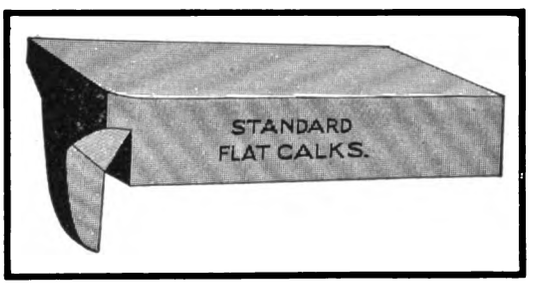
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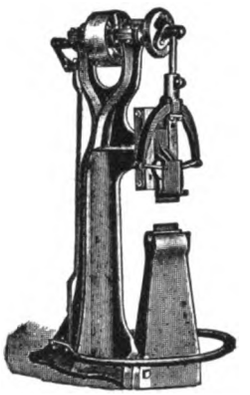


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Universal Tenon AND Boring Machine
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Vulcan Power Hammer,
Only perfect adjustable stroke, operated entirely by treadle.



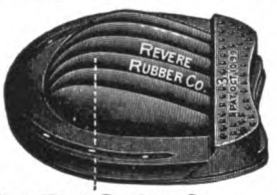
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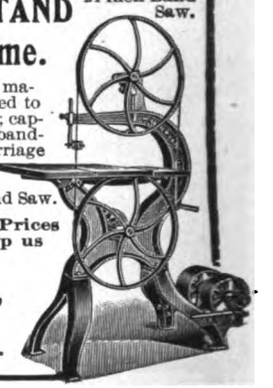


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This Malleable Iron Bolster Standard has been tested thoroughly, and we guarantee it strictly as represented.

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4. Great time saver. Can be attached to bolster in one-fourth the time required to put on wood stake. Adapted to new and repair work. The price will justify all classes of the trade in using this standard.

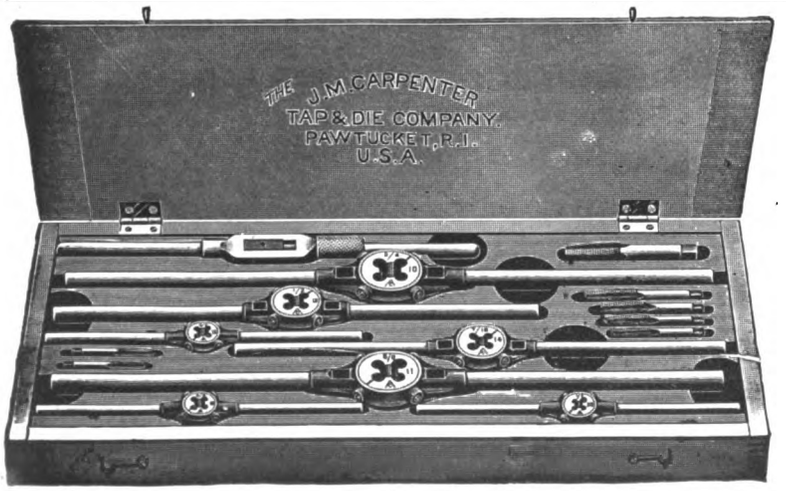
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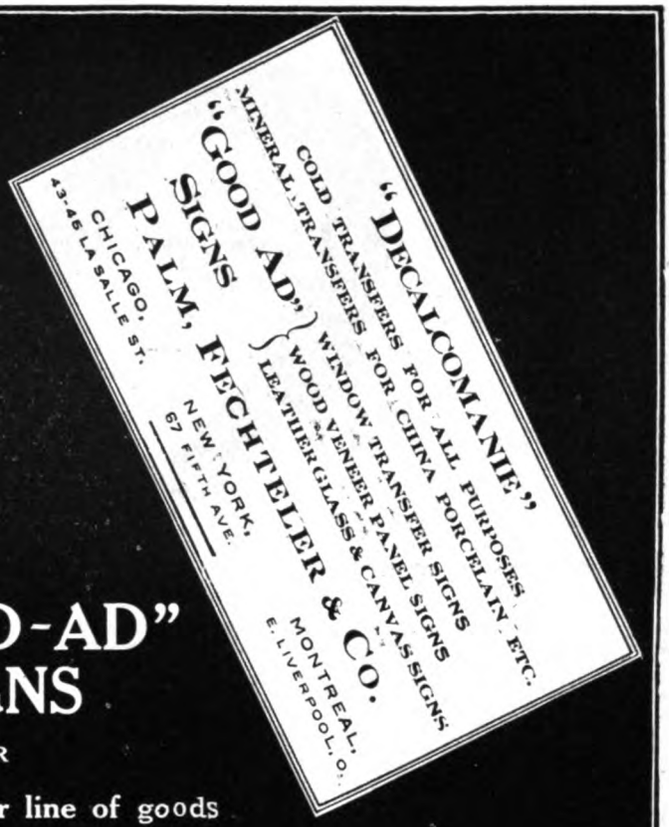
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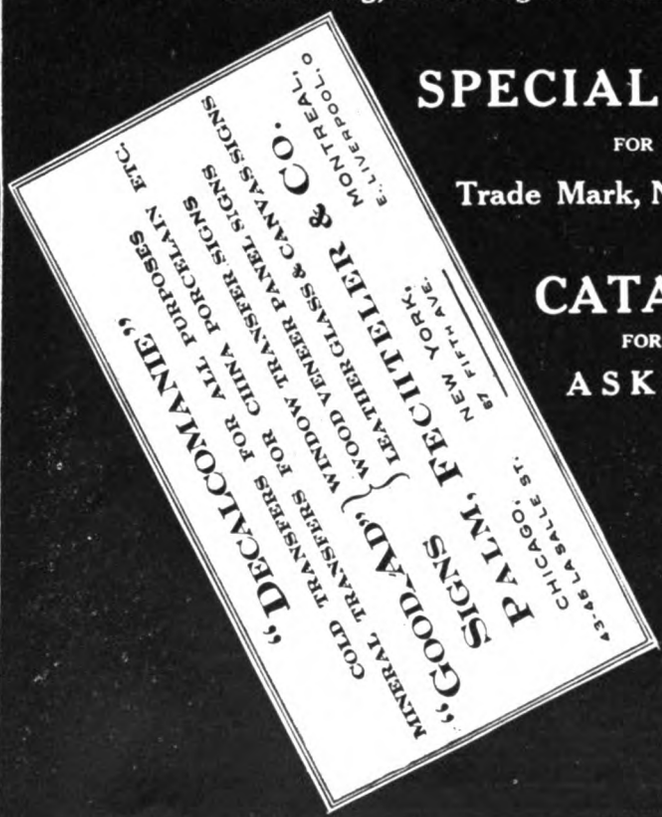
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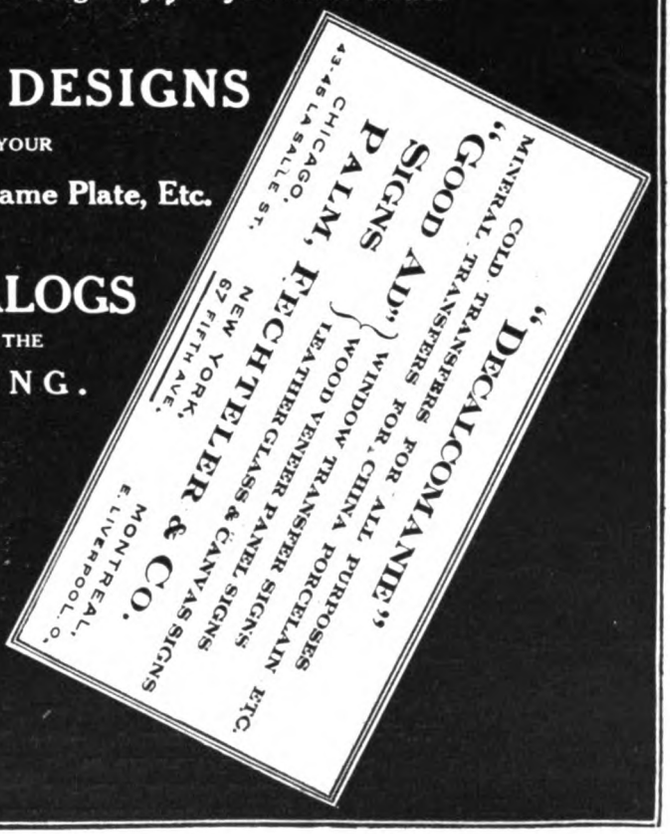
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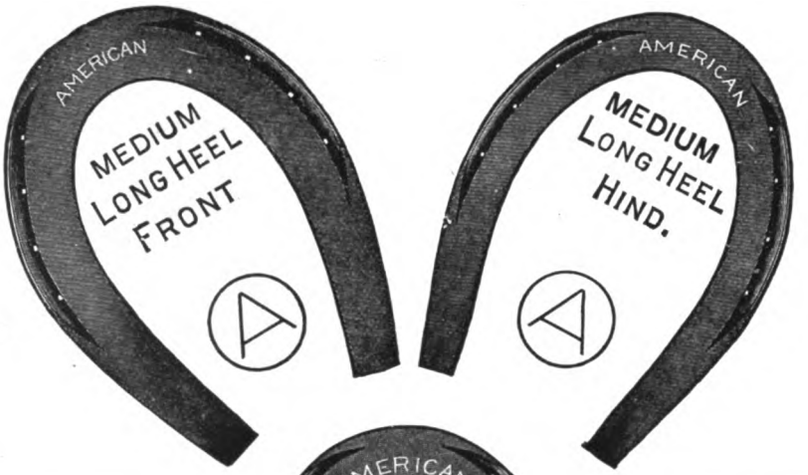




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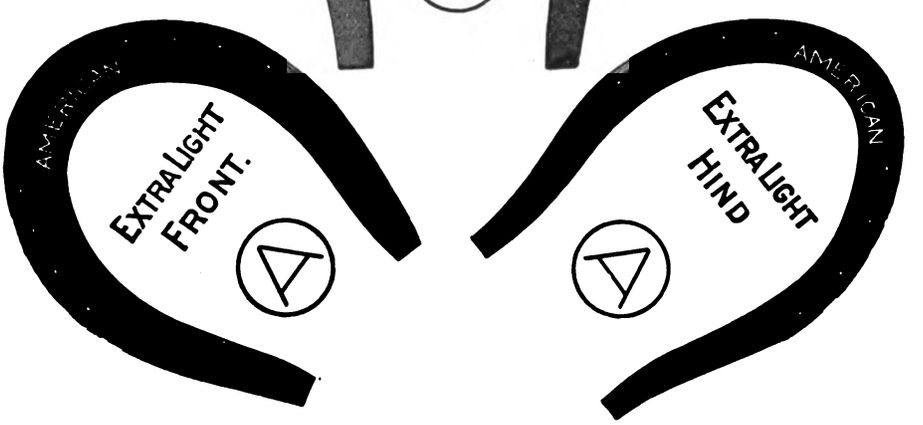
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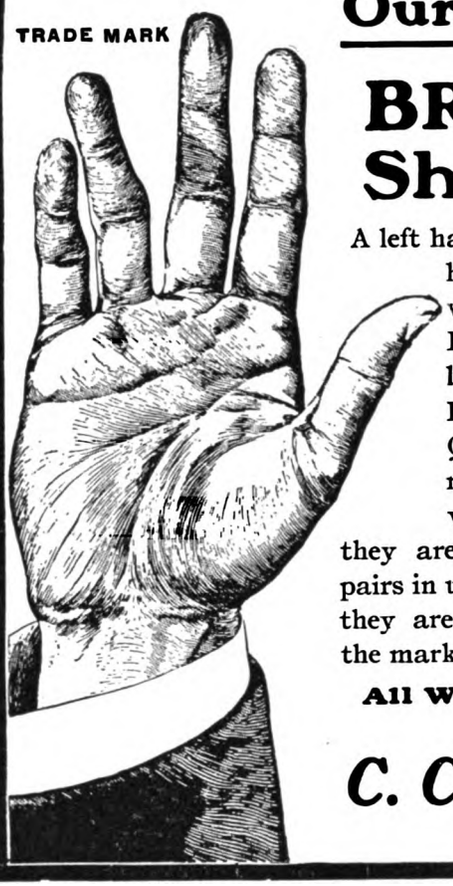
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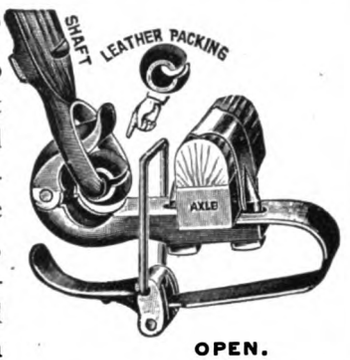


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A left hand will do as well. We are willing to hold up our right hand and swear that we are the original makers of a Ball Bearing, Leather Packed Shaft Coupling, that **Bradley Couplings** are Drop Forged from Bar Steel, are Silent, Quick Shifting, Self Lubricating, Automatically take up their own wear and will outwear any vehicle to which they are attached. There are over a million pairs in use. Quality and advantages considered, they are the cheapest and best couplings on the market.



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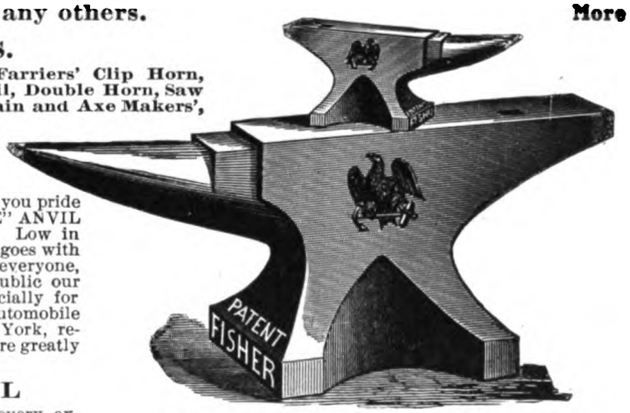
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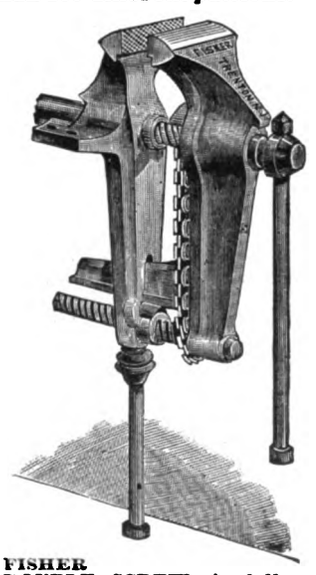
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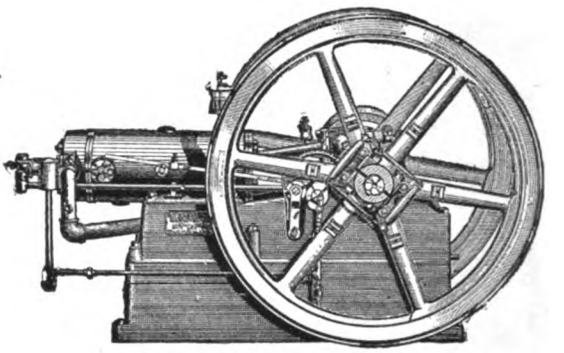


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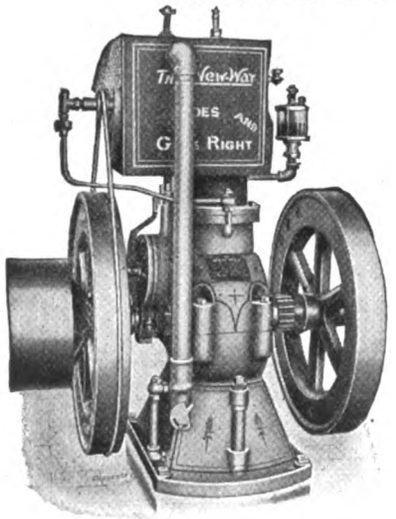
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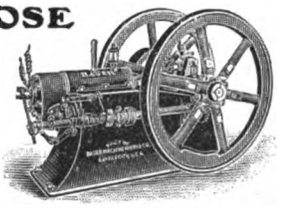
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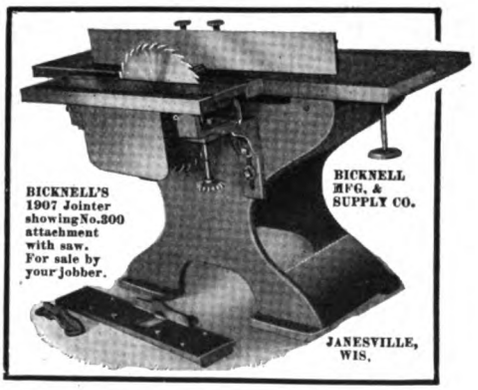
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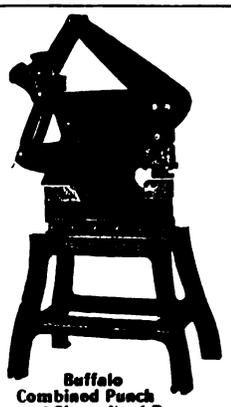
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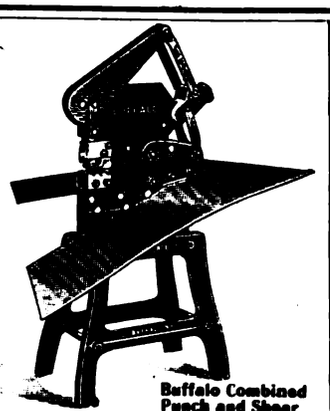


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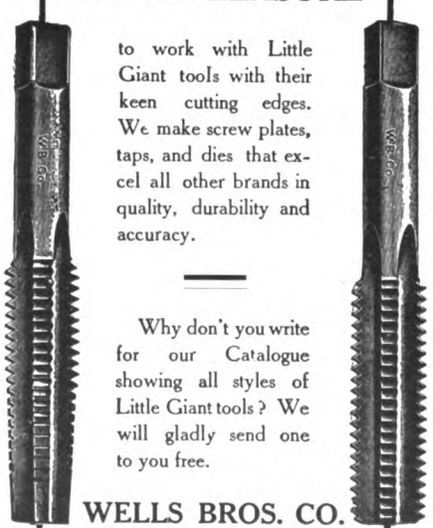
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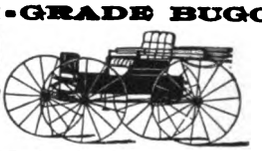
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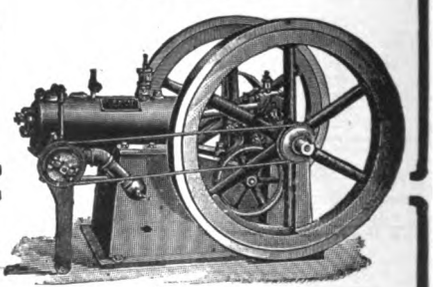


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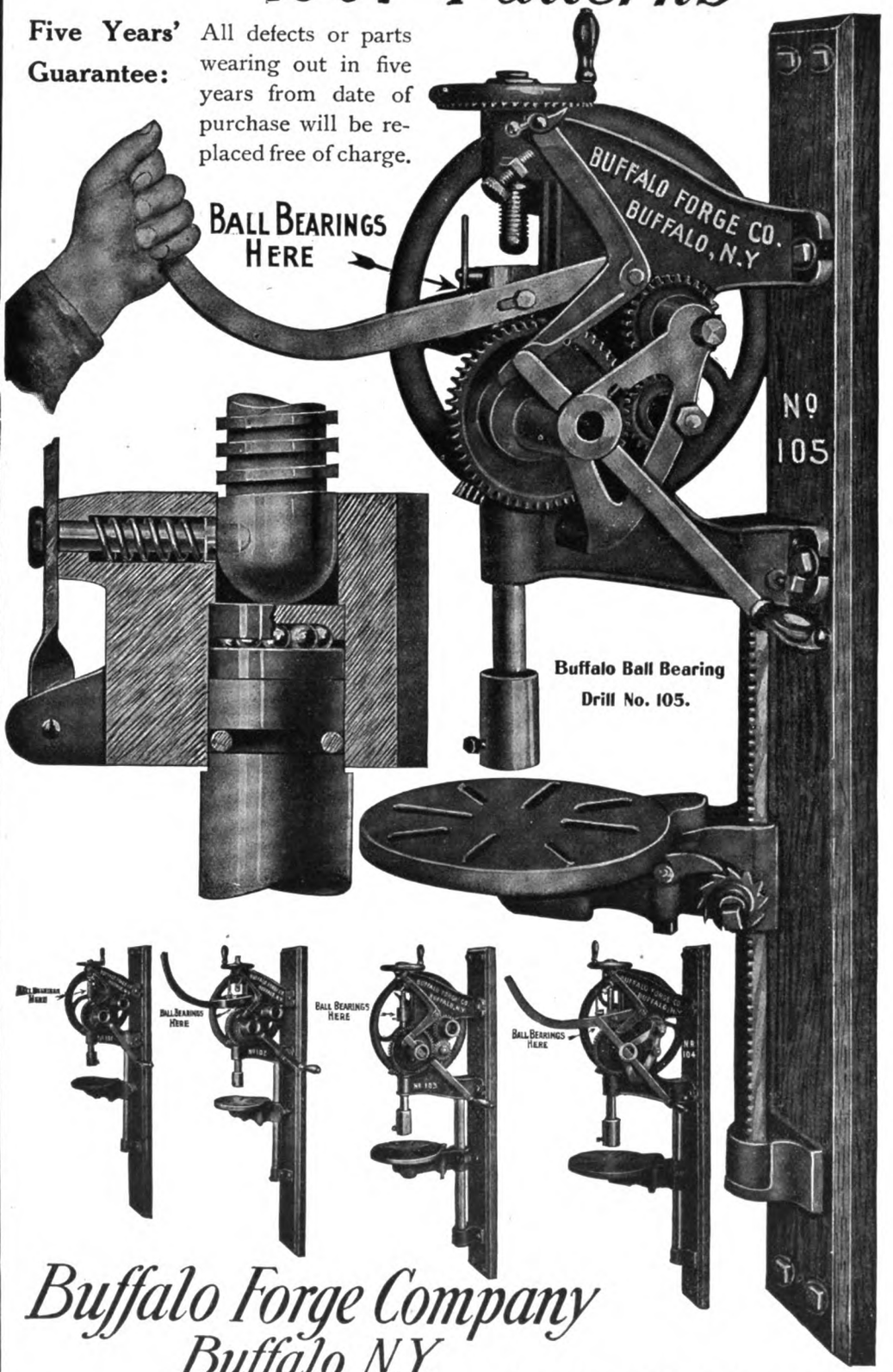
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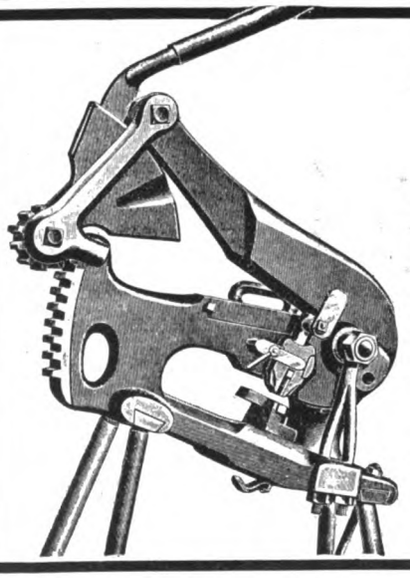
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We will give this machine free to anyone that can show a machine that will come up to it. It has 38 ton, 800 pounds pressure on end of a four-foot lever. A man weighing 125 lbs., cuts off ½ inch, 4 inches wide; punches ½-inch hole through ½-inch with one hand. Cold Tire Setter attached to No. 3 machine. Sets tire from ¾ to 1¼ inches, and does it well. Does not destroy tires.

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DO YOU KNOW WHY Powers Rubber Horse Shoes ARE THE BEST?

BECAUSE: They are the most DURABLE.

BECAUSE: They are made of the best drop forging, and part rubber and rubber fibre, which prevents slipping on either dry or wet pavement.

BECAUSE: They do not break off at the heel, and wear even until worn out.

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BECAUSE: They save contracted heels.

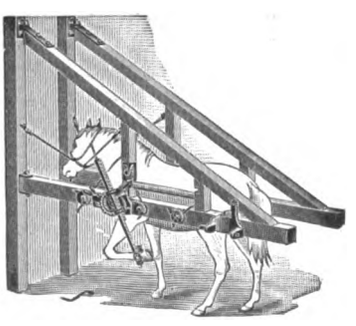
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BARCUS HORSE STOCKS
ARE THE BEST AND CHEAPEST ON THE MARKET
For Full Particulars Write
Geo. Barcus & Co.
Box 61,
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Colville, Wash., Feb. 9, '07.
GEO. BARCUS & CO.
Gentlemen: Yours of Feb. 2nd at hand. I received the stocks February 4th, and have them up and have shod one horse in them and have another for Monday morning. I shod a horse in 45 minutes, that I have been throwing, before I got the stocks. I took one shoe off at a time, sharpened it and put it back. Before, it took me from two and a half to three hours, and once he laid me up for a week. Will forward more money in a few days. Yours truly,
C. C. DARNELL.

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ROTH FORGE BLOWER

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Write for interesting prices and bulletin No. 1611

ROTH BROS., 27 So. Clinton St., Chicago, Ill.

NEW YORK OFFICE: 136 Liberty Street.

ONLY 60 CENTS Did you ever try to shoe a horse that would not stand still? By the use of my great *Pulley Breaking Bridle* you can make the most restless horse stand as quiet as a lamb—even ugly horses, stallions, etc., completely subdued while being shod. Price, **Only 60c postpaid.** You should own one.



Will bring business to you. Send for circular telling all about it.

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Also Team Doubletrees, Poles, Shafts, 3-Horse Hitch

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Insist on the Adams End Plate from your Jobber or write us

Be sure and get the Adams Patent End Plate

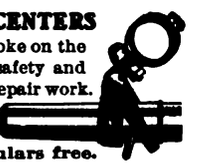
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the only practical lock neckyoke on the market. None better for safety and durability. Very handy for repair work. Have you tried them? Ask your jobber for them.

Descriptive circulars free.

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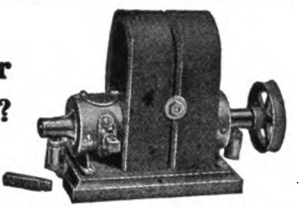
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"A Wizard Tubular" Does It.



Armature incased in WATER-PROOF non-corroding brass tube.
All brass screws. Friction, Belt or Governor drive.
Brush-holders removed without loosening screws.
All parts polished brass. Contact and Jump Spark.
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TRIMMINGS FOR EVERYTHING ON WHEELS



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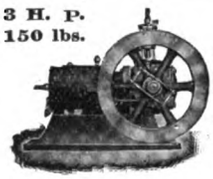
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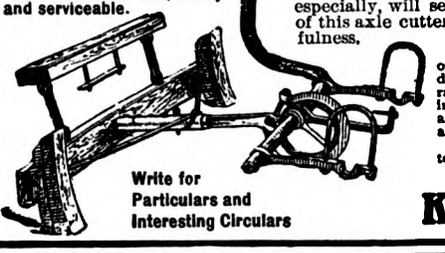
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KELLER ECCENTRIC BRAKE

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Note its construction, sturdy and serviceable.



Blacksmiths, wagon and buggy repairers especially, will see at a glance the merits of this axle cutter and appreciate its usefulness.

It will cut a pipe, boiler tube or shaft, as little or as much as desired and do its work accurately, taking the merest shaving from the end or cut in two at any point, its bearings being all on one side of the knife.

Attractive proposition offered to live agents.



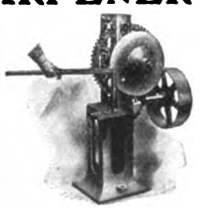
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FIGURES DON'T LIE!

Average Yearly Cost for Fuel, Old Style Forge, $55.00
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YOU SAVE, PER FIRE, EACH YEAR, 18.33

GUARANTEED FOR FIVE YEARS

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"A FORGE FOR EVERY TRADE."

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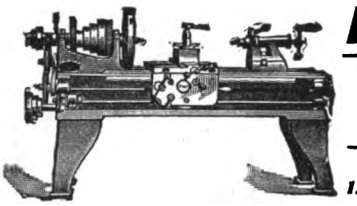
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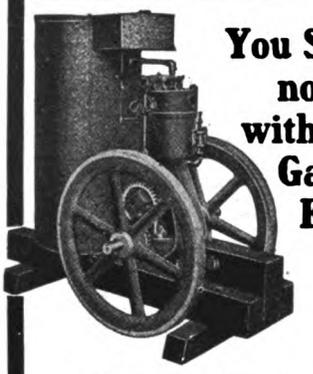
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The **"Cray Bros."** Gasoline Engine has been proven by test to be **the most powerful and durable** on the market.

The mechanism is **simplified** as much as possible, and at the same time is made **strong and serviceable,** capable of performing **wonderful feats.**

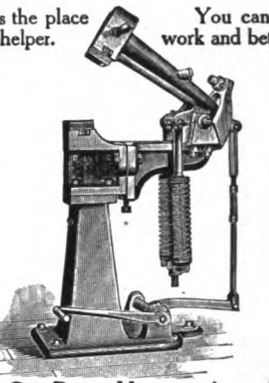
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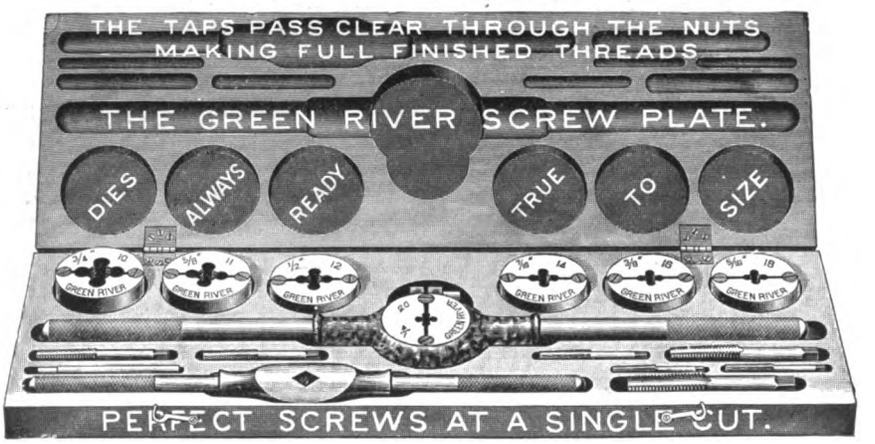
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BY USING A
STANDISH FOOT-POWER HAMMER.

Takes the place of a helper. You can do more work and better work.



Our Power Hammers give perfect satisfaction wherever used and they are doing good work in the best shops in the country. Drop us a card and we will send you **interesting descriptive circulars free. Write at once—today.**

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The die is gripped in an elastic stock. A stock of this kind binds the die at every point, making the best possible die-holder to be had.

The dies can be quickly changed from one size to another by simply loosening the screw at side of stock with a key.

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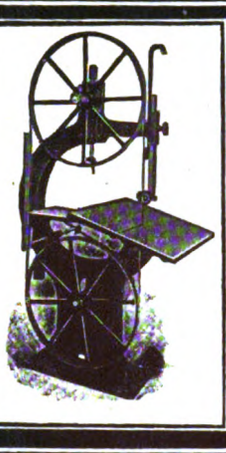
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132 Washington St.,
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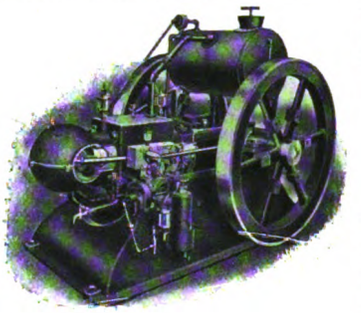
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